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Included in the annotated bibliography are books, magazine articles, and bibliographies related to the subjects of programed learning, reports on relevant research studies, lists of teaching machines, publications on learning theory and the psychology of learning, sources of programed materials, periodicals specifically devoted to programed instruction and teaching machines, and audiovisual materials which present teaching machines and programed learning. All material was written between 1950 and 1962. Because new materials for use in programed instruction appear frequently and materials available at a specific time are sometimes subsequently revised or withdrawn from the market, some sources mentioned may no longer be current.

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Selected Reading on Programed Learning

NYS Ed Dept

THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
BUREAU OF SECONDARY CURRICULUM DEVELOPMENT
ALBANY, 1963 JO758

THE UNIVERSITY OF THE STATE OF NEW YORK

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FOREWORD

This publication is designed to provide an annotated list of selected readings on programed learning for the use of teachers and administrators. It also provides information on sources for programed materials as well as a list of periodicals which are devoted specifically to programed learning and teaching machines.

It should be noted that new materials for use in programed instruction appear frequently and that some of the materials now available are being revised or completely withdrawn from the market. These factors may have some possible effect upon the sources mentioned in this bibliography.

The manuscript was prepared by Dorothy A. Currie, Supervisor of School Libraries and AV Instructional Materials, Yonkers Public Schools and reviewed for form by Audna Clum, librarian, Averill Park High School. The manuscript was reviewed and valuable suggestions were made by Loran Twyford, Chief, Bureau of Classroom Communications, Division of Educational Communications and William Ryan, Associate in Educational Communications. The manuscript was edited and prepared for production by Vivienne Anderson, Acting Chief, Bureau of Secondary Curriculum Development.

GORDON E. VAN HOOFT
Chief, Bureau of Secondary
Curriculum Development

WARREN W. KNOX
Assistant Commissioner
for Instructional Services
(General Education)

General Section

Adams, Sam. A fable of the 80's. National Education Association Journal, v. 50, no. 8. p. 24. November 1961

Satire on the ultimate and almost complete mechanization of education.

Anderson, R. C. Role of the educational engineer. Journal of Educational Sociology, v. 34, no. 8. pp. 377-81. April 1961

Discussion of the development of the steps in a teaching program involving specifications for outcomes; behavioral goals, skills, or concepts; assumptions of what students know, and how to apply these factors in the teaching process. Behavioral science applied to the educational processes.

Astor, Martin, & Astor, Eleanor. Machines aid learning. Clearing House, v. 36, no. 4. pp. 203-5. December 1961

Brief statement of development of teaching machines and programed learning. Considers organization of information according to learning principles. Short resume of experiments in process.

Babcock, C. D. Teacher, TV, and teaching machines. National Education Association Journal, v. 49, no. 5. pp. 30-1. May 1960

Discussion of problems involved in changing from traditional teaching methods to new technologies. Summarizes characteristics of teaching machines and programed materials and the advantages claimed for these on the basis of experimental evidence.

Barr, A. S. Teaching machines: shall we test them? Journal of Educational Research, v. 55, no. 3. p. 141. November 1961

States need for reports of carefully controlled experimental studies, including exploratory studies, cost studies, and comparative studies, indicating the significance of each type.

Beringause, A. F. Teaching machine. High Points, v. 43, no. 5. pp. 21-4. May 1961

A brief description of what has been developed in teaching machines, comments concerning some experimentation in process, and descriptions of several types of machines. States that the basic problem is determining what to teach.

_____Teacher and the machine. High Points, v. 43, no. 6. pp. 42-5. June 1961

Review of Galanter's Automated Teaching and Lumsdaine's Teaching Machines and Programmed Learning.

Bissmeyer, O.E. Teaching machines. Kentucky School Journal, v. 40, no. 3. p. 16. November 1961

Factual definitions of what is meant by "comparing" answers, feedback, and sequence. Statement of what a machine cannot do.

Blyth, J. W. Teaching machines and human beings. Educational Research, v. 41, no. 2. pp. 116-25. April 1960

Discussion of values found in teaching and learning from materials programed for machine use as indicated by the director of an experiment in the teaching of logic at Hamilton College. Presents various aspects of programing techniques and what this movement means to contemporary education.

Boehm, G. A. W. Can people be taught like pigeons? Fortune, v. 62, no. 4. pp. 176-9+. October 1960

Discussion of Skinner (linear) and Crowder (branching) techniques, pointing out similarities and differences. Describes experimentation in process with each type. Explores various kinds of machines, how they relate to programed materials. Presents problems which educators need to consider in further research.

Boutwell, W. D. What's happening in education? National Parent Teacher Association Magazine, v. 54, no. 10. pp. 11-2. June 1960

Discusses two principle methods of learning and adapts the programing of materials to them. Brief statement of nature and functions.

Briggs, L. J. Probable role of teaching machines in classroom practice. TIP, v. 1, no. 1. pp. 47-56. February 1962

Projects these problems into the role teaching machines will play in the future: 1. where to use, 2. what kinds to use, 3. instructional procedures, 4. special uses, 5. implementation. Bibliography.

Brish, W. M. Administrative changes dictated by research in newer educational media. In Newer Educational Media, Pennsylvania State University. 1961 pp. 43-56

How using the new media in education affects the learning of students and learning resources. What the potentials and limitations of these media mean to the educational program, where they can be used most effectively, and how the administrator must recognize the total effect on staff, space, and scheduling.

Bush, R. N. Schools without teachers: an essay on the teaching machine. Journal of Secondary Education, v. 37, no. 2. pp. 65-8. February 1962

Relates general educational problems to development of new ideas which permit greater efficiency and effectiveness. Suggests how teaching machines and programed materials may help solve problems.

Campbell, V. N. Adusting self-instruction programs to individual differences: studies of cueing, responding and bypassing. American Institute for Research, July 1961

Several ways of adjusting self-instruction programs to individual differences are explored.

Casmir, F. L. Human teacher is still best. California Teacher Association Journal, v. 56, no. 6. pp. 41-4. September 1960

Analyzes the statements supporting the claims for teaching machines and programed materials, showing how these statements fail, if they are true, to solve educational problems. Suggests that this medium only presents and directs factual learning patterns.

Chagy, Gideon. The teacher and the teaching machine. Journal of Secondary Education, v. 37, no. 2. pp. 125-8. February 1962

Report on development and growth of use of teaching machines and programed learning, on teacher attitudes, on relationship of programed learning to learning efficiency, on changes in the teacher's role in this kind of program.

Clark, E. C. Teaching machines and programed materials. Catholic School Journal, v. 61, no. 10. pp. 17-9. December 1961

Suggests term "self-instruction through programed materials" as more accurate than "teaching machines." Points to values in teaching for remedial purposes, individual pacing of learning, role of feedback, degree of time conservation.

Cocking, W. D. Teaching machines. Overview, v. 2, no. 8. p. 63. August 1961

Cautions administrator to know what teaching machines can and cannot do, suggests practical uses of them, and points out need for extensive experimentation to determine significant functions.

Conner, F. E. What should an administrator's attitude be? National Education Association, v. 50, no. 8. pp. 26-7. November 1961

States that values claimed for teaching machines and programed learning have not yet been demonstrated, and that there are no standard means of testing the results of such experimentation. Analyzes claims and limitations in terms of educational goals. Indicates need for more information about them before blanket acceptance.

Cook, D. L. Automization of Socrates. TIP, v. 1, no. 1. pp. 9-30. February 1962

Description of many of the available teaching machines and the principles of learning inherent in the materials to be used with them. Discussion of such terms as sequence, feedback, and program. Stresses need for research, materials, and evaluation. Bibliography.

Cram, David. Explaining "teaching machines" and programming. Fearon. 1961

Explanation of what programing is and what a teaching machine is. Examples of different kinds of programing with an analysis of the developing of sequences. Pictures some of the different kinds of teaching machines. Bibliography.

Creegan, R. F. Automated education: must it be dogmatic? School and Society, v. 90, no. 2211. p. 258. Summer 1962

Discusses the Skinner experiments, their adaptation in human learning. Raises the question of how to teach reasonable doubt and criticism by means of this method.

Darby, C. L. Research memorandum: an annotated bibliography on the automation of instruction. U.S. Army Air Defense Human Research Unit, Fort Bliss, Tex. 1959

Individual and group instructional devices, principles of learning and learning theory are the subjects of this annotated bibliography.

Day, J. H. Programmed instruction in chemistry. Journal of Chemical Education, v. 39, no. 1. pp. 50-52. January 1962

What programed learning is and what it does for the student and the teacher. Discusses machines, the eleven steps of linear programing, and gives examples. Describes intrinsic program and its method.

_____Teaching machines. Journal of Chemical Education, v. 36, no. 12. pp. 591-5. December 1959

Effective and efficient teaching situations resulting from use of teaching machines. Discusses both Skinner and Crowder methods, giving examples of each. Offers advice on pitfalls of hasty judgment of experimentation in process.

Diedrich, P. B. Self-correcting homework in English. In Hull, Helen, ed. Education: intellectual, moral, physical. Univ. of Philadelphia Press. 1960. pp. 258-271

Description of several simple devices for use with programed materials which the teacher can make. Also discusses the Crowder and Skinner machines and the Harcourt English 2600 program.

Directory of programs. Audiovisual Instruction, v. 7, no. 3. pp. 158-60. March 1962

A list of programed sequences available in mathematics, together with the agency or company responsible for their development. Includes specific titles.

Eaton, D. K. Teaching machines: a bibliography. Univ. of Oregon, School of Education, Eugene, Ore. 1961

Annotated bibliography including references on learning theory, experimental research, and reports of results, kept up to date by supplementary issues.

Eigen, L. D. Construction of frames of an automated teaching program. Center for Programed Instruction. 1961

How to program material and how to "cue" material with examples of these techniques.

_____Some problems in field testing programs for teaching machines. Journal of Educational Sociology, v. 34, no. 8. pp. 372-6. April 1961

Cites major problems in programing such as: lack of responsible research in the field, unavailability of machines, difficulty of obtaining programs, types of formats, administration of field tests, evaluations.

_____Technology and educational practice. Center for Programed Instruction. 1961

Common factors in educator's, psychologist's, and engineer's roles in regard to programed instruction.

_____ & Komoski, P. K. Teaching machines can aid schools to make better use of the teacher's time. California Journal of Secondary Education, v. 35, no. 4. pp. 252-4. April 1960

Advantages to education which accrue through the use of teaching machines. What the machine can and cannot do.

_____Teaching machines can aid the schools to make better use of the teacher's time. Center for Programed Instruction. 1961

Discussion of the advantages of programed instruction to permit the teacher to do a more effective job.

Electronic learning. American Seating Company, Grand Rapids, Mich. 1962

A "how-to-use" booklet which stresses the teacher-student feedback in its suggestions for best results from teaching machines and programed learning.

Epstein, Sam, & Epstein, Beryl. First book of teaching machines. Watts, F. 1961

In easy-to-read manner, the authors present a brief historical outline of the work of educators and psychologists,

describe the machines, and give samples of programed material. Profuse illustrations. Written for children, but readable for adults.

Exton, Elaine. Teaching machines: fad or here to stay? American School Board Journal, v. 141, no. 3. pp. 18-22. September 1960

Comprehensive report on types of teaching machines and their characteristics. Practical advice on usage. Survey of teaching materials and where they are being used. Costs involved. Good reference on many phases important in making decisions about what to get and how to use it.

Fehr, J. D. Programing language for deaf children. Volta Review, v. 64, no. 1. pp. 14-21. January 1962

Brief statement of nature of programed materials and of characteristics of the individual frame. Review frames as they are different from teaching frames. Example of developmental sequence of 42 frames for a lesson for 8 to 10 year old boys with profound hearing loss, and the results of experiment.

Fine, Benjamin. Teaching machines. Sterling. 1962

A popularly written readable book, presenting many basic aspects of teaching machines and programed learning. Devices are discussed. Valuable as an introduction to the area or for the lay reader.

Finn, J. D. Educational technology--a new force. American Library Association Bulletin, v. 55, no. 2. pp. 118-121. February 1961

Discussion of the revolutionary changes in technology leading to changes in educational communications media as well as in education in general.

_____Teaching machines: auto-instructional devices for the teacher. National Education Association Journal, v. 49, no. 8. pp. 41-4. November 1960

Defines the teaching machine, presents theories of programing, describes types of machines, and summarizes the "state of the art."

_____Technology and the instructional process. AV Communication Review, v. 8, no. 1. pp. 5-26. Winter 1960

Describes technology as a way of thinking as well as a process. Tells how technology relates to instruction and to education; how it influences educators; gives trends in 1960, examples of applications of technology in education, and implications for education. Bibliography (Part I: Technology & Society; Part II: Technology of instructional process.)

_____ & Perrin, D. G. Bibliography on new media and instructional technology. National Education Association, Washington, D. C. 1962

One of the publications of the Technological Develcpment Project of the National Education Association and United States Office of Education. Includes three sections pertinent to programed learning: Section IV; Section VIII, Parts C and D. Other listed articles and books will be helpful, generally, in the area of AV instruction.

Finn, J. D. & Richardson, Elinor. Principal faces the new technology. National Elementary Principal, v. 40, no. 4 pp. 18-22. January 1961

Leadership role of the principal in education in developing specific programs such as the audio-visual program, the educational television program, and programs geared to the newer technologies. Brief summary of the kinds of research programs in progress and their findings.

Fitzgerald, H. T. Teaching machines: a demurrer. School Review, v. 70, no. 3. pp. 247-256. Autumn 1962

Discussion of the claims made for teaching machines and programed instruction, and a statement of criticisms of these claims.

Foltz, C. I. World of teaching machines. Electronic Teaching Laboratories, Washington, D. C. 1961

Survey of teaching machines available on the market, how they function to make education more effective, research in process, and other information basic to the development of this kind of program.

Forbes, J. E. Programing takes many talents. Audiovisual Instruction, v. 7, no. 3. pp. 156-7. March 1962

Description of the four kinds of expertness necessary in developing a programed sequence. How the construction of programs operates at the Britannica Center for Studies in Learning and Motivation.

Ford, E. A. Rural renaissance, revitalizing small high schools. U. S. Office of Education, Washington, D. C. 1961

Brief description of characteristics of teaching machines and programed learning; how they function. Suggests need for classroom experimentation to compare claimed results against actual results. Lists and reviews some experimental projects under way.

Fry, Edward. Teaching machines and reading instruction. Reading Teacher, v. 15, no. 1. pp. 43-5. September 1961

Describes teaching machines, methods of handling materials, kinds of responses, psychological principles applying to learning, role of the teacher.

Fry, Edward. Teaching machines: the coming automation. Phi Delta Kappan, v. 41, no. 1. pp. 28-31. October 1959

Examples of teaching machines developed to this date. Characteristics of these machines, operational behavior of learner, where they are being used, what the evaulations indicate.

_____ & others. Teaching machines: an annotated bibliography. AV Communication Review, v. 8, no. 2, Supplement 1. March-April, 1960 (Available separately from Dept. of Audio-visual Instruction of the National Education Association.)

Development of the teaching machine approach to education as shown in experimental studies, summary of devices, along with an extensive and valuable bibliography which contains many items difficult to trace. One of the basic references.

Fusco, G. C. Programmed self-instruction; possibilities and limitations. High School Journal, v. 44, no. 2. pp. 85-90. November 1960

Nature of programed self-instructional materials and teaching machines. What they can do; what they cannot do. Cites need to explore relationship of learning theory to techniques of education.

_____Technology in the classroom: challenges to the school administrator. School Life, v. 42, no. 7. pp. 18-23. March 1960

Presents problems in education today, the role of materials in the educational processes, the characteristics of various kinds of programed materials and machines.

Galanter, E. H., ed. Automatic teaching: the state of the art. Wiley. 1959. bibliography

A basic reference containing a series of sixteen papers, most of which were presented at the first conference on The Art and Science of the Automatic Teaching of Verbal and Symbolic Skills, 1958, University of Pennsylavania.

Covers various aspects of programing of materials and the machines which may be used: machine as a teacher, learning efficiency factors, various methods of programing, examples of programing, effects of programed teaching on education, summary of experiments and developments in the field, psychological theories of learning.

Galanter, Eugene. Mechanization of teaching. Bulletin of the National Association of Secondary School Principals, v. 44, no. 255. pp. 301-9. April 1960

Brief history of the various forms man has used for instructional purposes; how modern technology has influenced modern forms. Describes the teaching machine and programed learning movement -- its characteristics, its contributions to learning, its strengths and weaknesses, and the problems still to be solved in its development and use.

Galanter, Eugene. Two models of a student. Teachers College Record, v. 62, no. 3. pp. 187-94. December 1960

Comprehensive discussion of what auto-instructional devices are, what they permit to be presented, how they operate, kinds of learners and learning techniques, organization of material for learning, short-term and long-term memory associations possible with their use.

Gates, A. I. Teaching machines in perspective. Elementary School Journal, v. 62, no. 1. pp. 1-13. October 1961; Condensed in Education Digest, v. 27, no. 5. pp. 9-12. January 1962

Brief summary of early teaching machines and programing techniques, describing their characteristics and the limitations. Suggests need for critical research to precede rather than follow acceptance.

Discusses tachistoscopic machines as teaching machines, indicating their development and uses in teaching and research.

Geis, G. L. Some considerations in the evaluation of prgrams. AV Communication Review, v. 10, no. 1. pp. 64-9. January 1962

Discussion of four evaluative factors in programed materials: error count, time score, terminal behavior, and reinforcement. Suggests need for greater research into specifics involved in these as they relate to the developing of programs.

Ginther, John. Man, values, and the machine. Elementary School Journal, v. 60, no. 4. pp. 179-89. January 1960

Critique of Galanter's presentation at the 1959 University of Chicago meetings on programed materials and teaching machines. Analyzes basis for statements and examines theories presented. Incisive and thoughtful.

_____More on teaching machines. Elementary School Journal, v. 61, no. 5. pp. 239-41. February 1961

Critical comment on NEA report on teaching machines (October 22, 1960), calling attention to purported inaccuracies and misrepresentations. Raises significant questions of effects of use of teaching machines and programed materials.

Glaser, Robert. Learning and the technology of instruction. AV Communication Review, v. 9. no. 5. pp. 42-55. September 1961

Stresses need for bringing findings of the experimental psychologist into educational psychologist's methodology. Summarizes learning theory and experimentation. Describes the applications of these findings in programed learning, indicating how the experimental results determine the nature of programing.

_____Principles and problems in the preparation of programmed learning sequence. In Newer Educational Media, Pennsylvania State University. 1961 pp. 19-42

Indicates characteristics of programed materials and steps to take in developing such materials. Points to relation of subject matter to type of programing best fitted to provide learning experiences. Describes administrative problems, evaluative problems, various types of machines, and the significance of experimentation in educational psychology.

_____ & Fullick, Margaret. Programmed learning and classroom instruction. Pennsylvania School Journal, v. 108, no. 9. pp. 366-9. May 1961

Describes programing and how the student uses programed materials. Analyzes learning psychology which may apply to the use of these materials. What programed materials mean to students, teachers, curriculum, school organization. Summary of developments in the field.

Glaser, Robert, & Homme, L. E. Relationships between the programmed textbook and teaching machines. Paper read at Office of Scientific Research, University of Pennsylvania; Conference on Automatic Teaching of Verbal and Symbolic Skills; Philadelphia, Pa. December 1958

Description of a programed textbook, how to use it, what to expect in results from use.

Goodman, Roger. R. U. R. revisited. High Points, v. 43, no. 6. pp. 16-22. June 1961

Stresses that the teacher is more important than any machine- that the human elements of interest and concern and discipline and affection are significant in working with individual human beings. Efficiency in learning is not enough.

Gotkin, L. G. Readers on the record. Teachers College Record, v. 63, no. 4. pp. 313-4. January 1962

A reply to Sturlow's article in October 1961 TC Record, presenting a different aspect of the problems and a different viewpoint in solutions.

Greene, H. J. & Cherry, G. S. Teaching machines: total involvement, quality education. Bulletin of the National Association of Secondary School Principals, v. 46, no. 272. pp. 93-6. March 1962

How the teaching machines movement may improve the status of the teacher, how it may bring about greater involvement of the student with his learnings on a conscious level, how the movement relates to the quality-quantity dilemma of education.

Greenhill, L. P. & Frazier, Alexander. Opinions differ; technology in education. National Education Association Journal, v. 49, no. 6. p. 73. September 1960

A pro-and-con discussion of characteristics of programing, operation of programed materials in education, practical suggestions for evaluating the claimed advantages and the actual results of using this new technology.

Guba, E. G. Teaching machines are here to stay. TIP, v. 1, no. 1. pp. 1-6. February 1962

Summarizes practical and theoretical issues pertaining to teaching machines and programed learning as being: 1. adjunctive vs. initial programing, 2. structural vs. open-ended responses, 3. challenging vs. shaping. Raises practical problems of content, grade levels, cost, and kind.

Guide to the use of programmed instruction. American School Board Journal, v. 144, no. 6. pp. 23-4. June 1962

Description and summary of the document of the same title prepared by the Advisory Committee on Programmed Instruction of the Pennsylvania Department of Public Instruction in 1961. Includes background information, descriptions of various kinds of programs, relationship of this kind of learning to findings in learning psychology, its contributions to educational needs, and costs. Practical and helpful.

Hanzeli, V. E. Programmed learning in French: work in progress. French Review, v. 35, no. 6. pp. 587-9. May 1962

The development of programed material for French (by various companies, people, colleges, and universities) now in process, but unavailable, is described. Distinguishes between programed learning materials and self-instructional materials. Emphasizes that basic elements are the materials, the teacher, and the learner.

Harms, L. S. Programmed learning for the field of speech. Speech Teacher, v. 10, no. 3. pp. 215-9. September 1961

Describes the development of programed materials and their relation to the psychology of learning. Gives examples of ways of programing a learning sequence in phonetic transcription. Discusses various steps, values, and problems.

Harper, W. T. More programing or status quo for business education. Journal of Business Education, v. 37, no. 3. pp. 109-10. December 1961

Explains origin of term "program teaching" in its relation to UNIVAC and other computers. Applies uses to typing, shorthand, bookkeeping, analyzing each subject in terms of whether they lend themselves to this technique. Explores possibilities of application in business education.

Heisler, Florence. Programmed learning can better teacher-pupil relationship. Grade Teacher, v. 79, no. 9. p. 54. May 1962

Indicates that programed learning is not new in the spelling area, but that the mechanization approach is. Gives practical suggestions for use in spelling and arithmetic.

Hoerger, J. W. Minnetonka: satire. High Point, v. 43, no. 5. pp. 25-30. May 1961

Satire on the school of the future and its complete automation.

Holland, J. G. Evaluating teaching machines and programs. Teachers College Record, v. 63, no. 1. pp. 56-65. October 1961

Six criteria for evaluating programing and five criteria for evaluating machines. Practical guide for general applications.

Homme, L. E. From art to technology in teaching -- machine programming. TIP, v. 1, no. 1. pp. 38-42. February 1962

Gives historic perspectives in the development of programing. Stresses that the program is the core; tells how to go about programing. Bibliography.

Hoth, W. E. From Skinner to Crowder to chance: a primer on teaching machines. English Journal, v. 50, no. 6. pp. 398-401. September 1961

The differences in the Skinner and Crowder interpretations, the rationale for each, pros and cons as they relate to claims and their validity.

How teachers can evaluate teaching machines and learning programs. Teaching Materials Corporation. 1962

Excerpts from a study by Dr. William Odell (Stanford University), giving practical suggestions for teachers to use in evaluating programed materials and their potential uses.

Huffman, Harry. Putting the teaching machine on paper. Business Education World, v. 41, no. 8. pp. 13-8. April 1961

Example of programed material which makes use of the "write-in" answer technique.

_____Will the teaching machine make you obsolete? Business Education World, v. 40, no. 6. pp. 11-3. February 1960

Enthusiastic presentation of teaching machine as a "presenter of material to be learned" and as a medium permitting interchange of ideas. Reports on experimentation of Skinner and Pressey. Defines new role of teacher who uses this medium.

Huffman, Harry, & Margulies, Stuart. Teaching machine program for a topic in business math. Business Education World, v. 41, no. 9. pp. 16-21. May 1961

Example of unit on federal income tax in business mathematics, showing its adaptation to the programed technique.

Hyer, A. L. & Snider, R. C. The profession and the machine. California Teachers Association Journal, v. 56, no. 6. pp. 6-7. September 1960

Brief statement of the work of the Department of Audio Visual Instruction, N.E.A., in assuming a leadership role in the investigation of new technologies for educational purposes. What these new technologies mean to education and establish a need for a philosophy of application.

Ikenberry, N. B. Teaching machines. Elementary English, v. 38, no. 6. pp. 395-7. October 1961

Discusses how programed materials and teaching machines apply the principles of learning behavior delineated by Skinner's studies. Explains programing process, giving examples of sequential development of content. Summarizes some of the research in process. Indicates various applications in use of programed materials.

Jacobs, P. I. Some relationships between testing and auto-instructional programing. AV Communication Review, v. 10, no. 6. pp. 317-327. November - December 1962

Discussion of two problems in programing materials -- the selection of the order in which items are presented and the arranging of items in various sequences for different learners-- and the relation of these problems to testing and test construction. Bibliography.

Jenkins, W. J. Listening and machines. Elementary English, v. 37, no. 6. pp. 409-10. October 1960

Explains the Skinner and Pressey methods, relates them to psychological findings. Indicates need to discover the intrinsic and extrinsic values of this technique and how this technique relates to various aspects of subject content.

Johnson, D. A. Teaching machines and programmed learning. School Science and Mathematics, v. 52, no. 545. pp. 157-62. March 1962

Presents reasons for the growing interest in teaching machines. Suggests ways in which teaching machines can help in the solution of educational problems. Brief summary of the development of programed learning, its characteristics, its contributions to education. Stresses need for evaluation of programs involving teaching machines.

Joint committee statement. National Education Association Journal, v. 50, no. 8. p. 19. November 1961

Eight guidelines to the use of programed materials and teaching machines presented by members of the American Educational Research Association, the Department of Audio Visual Instruction, and the American Psychological Association, sitting together to form the joint committee for the purpose of developing an education statement about programed materials and teaching machines.

Kendler, H. H. Stimulus-response psychology and audiovisual education. AV Communication Review, v. 9, no. 5. pp. 33-41. September-October 1961

How the three separate components of the stimulus-response learning theory may be employed through the use of materials; the need for developing proper techniques to evoke the proper response. Indicates adaptations to teaching machines as potentially very productive.

King, P. E. Teaching machines and the language laboratory. American School Board Journal, v. 141, no. 2. pp. 17-8. August 1960

How these media may assist in solving the quantity-quality problem in education. Comparison of the characteristics of these two media, what each does, how they differ, what they can contribute to the educational program needs.

Klaus, D. J. Art of auto-instructional programming. AV Communication Review, v. 9, no. 2. pp. 130-142. March-April 1961

What programing is, what can be programed, how to define objectives in behavioral terms, the course outline, preparation of draft frames. Discussion of techniques for correct sequence. Practical guide.

Klausmeier, H. J. & Lambert, Philip. Teaching machines and the learning process. Educational Leadership, v. 18, no. 5. pp. 278-83. February 1961

How teaching machines may implement instruction and the relation of the processes involved in programed learning to conditioning and repetition theories.

Komoski, P. K. Programmed instruction and its place in education. Center for Programed Instruction. 1961

Background to the development of the programed instruction movement and the contributions this movement can make in contemporary education.

_____Programmed instruction: new technique for independent study. PTA Magazine, v. 56, no. 7. pp. 17-19. March 1962

Explanation of what a program is, how programs are developed, differences between texts and programed materials. Describes how programed materials and "packaging" may be used and what they can do. Lists steps to be considered in development of use.

Komoski, P. K. Programed materials. Nations Schools, v. 67, no. 2. pp. 74-5. February 1961

Presents similarities of programed materials to other materials as communication media. Stresses that the content and the arrangement of content are the most significant aspects since they involve the student in a situation of responding activities.

_____Programing by teachers for the school curriculum. Center for Programed Instruction. 1961

How programing can be used with effectiveness in teacher training; its values to the school and to the community.

_____Teaching machines and programed reading instruction. Center for Programed Instruction. 1961

How programed instruction can improve the teaching of reading.

Kowitz, G. T. Administering the automated school. American School Board Journal, v. 142, no. 2. pp. 13-6. February 1961

Summary of the forces and problems leading toward automation in schools; the ways in which automation may change the role of the teacher; the effect on content and subject divisions; problems involved in preparing students to use materials and equipment for learning.

Krugman, H. E. Education and the new learning devices. National Education Association Journal, v. 51, no. 4. p. 56. April 1962

How the use of teaching machines and programed materials may assist in retaining the "psychological dropout," may assist in determining students' problems for better guidance, and may help in developing patterns of learning for individual students generally.

Kvaraceus, W. C. Future classroom: an educational automat? Educational Leadership, v. 18, no. 5. pp. 288-92. February 1961

How programed materials and teaching machines function as instructional media, how their use relates to current problems in education, how the teacher may discover a more significant role.

Lamade, Wanda. Two approaches to programing materials. Adult Education, v. 12, no. 2. pp. 84-90. Winter 1962

Sampling of reports on auto-instructional programs. Summarizes work of Holland, Skinner, Komoski, Eigen, Crowder, and Pressey. Describes characteristics in its application to adult education.

Lawson, C. A. & others. Developing a scrambled book and measuring its effectiveness as an aid to learning natural science. Science Education, v. 44, no. 5. pp. 347-358. December 1960

Factual report of how a scrambled book was developed for use in a college course in genetics. Practical and clear analysis of methods and techniques -- how to develop goals, problems encountered in analysis and presentation of content, and samples of the final format and content. Summary of results on effectiveness as teaching medium and student reaction to it.

Leavitt, J. E. & Edgar, R. J. Programmed learning and teaching machines. Oregon State Department of Education, Salem, Ore. 1961

Two-part bibliography in the area from early development through June 1961.

Levine S. L. & Silvern, L. C. Evolution and revolution of the teaching machine. Part I. Journal of the American Society of Training Directors, v. 14, no. 12. pp. 4-16. December 1960 bibliog.

The background to the development of teaching machines, beginning with the Skinner patent in 1866 (#52758) and indicating the tremendous stimulus given the movement by the need to train men in the various branches of the armed services quickly during World War I. More recent developments; the growing interest of educators in this medium. Presently accepted definition of a teaching machine, giving characteristics and relating the various kinds of machines to the various kinds of programing.

_____Evolution and revolution of the teaching machine. Part II. Journal of the American Society of Training Directors, v. 15, no. 1. pp. 14-26. January 1961 bibliog.

Continuation of discussion published in December 1960 issue. Discusses two major areas: concepts and practices in planning a lesson and adaptation of the use of teaching machines in business and industry. Elaborates on organization of content, development of method or mode using learning theory, and the adaptation for machined use. Describes new role of training director.

Lobaugh, Dean, & McKinley, D. R. Teacher or machine? Clearing House, v. 36, no. 4. pp. 209-10. December 1961

A superintendent of schools and a high school principal (Davis, California) point out the characteristics of a good teacher which cannot be supplied by a teaching machine. Stresses the development of the proper relationship of people and society as major need in education.

Luce, G. G. Can machines replace teachers? Saturday Evening Post, v. 233, no. 13. pp. 36-7+. September 24, 1960

Easy-to-understand presentation of what teaching machines are and how programed materials differ from traditional textbooks. Describes reactions in various experimental projects, giving the findings from the research.

Lumsdaine, A. A. Some critical issues in the improvement of instruction through programed learning. AV Communication Review, v. 10, no. 1. pp. 61-64. January-February 1962

Presents five critical issues as being: 1. need for objective public information; 2. wise allocation of funds from government and foundations to support research; 3. development of techniques for using many media to complement each other; 4. re-examination of aims and objectives of education and teaching; 5. quality control of programed materials. Suggests seven criteria for evaluation programs.

_____Teaching machines and auto-instructional programs. Educational Leadership, v. 18, no. 5. pp. 271-4. February 1961

Learning theory relating to programed instruction, auto-instruction, teaching machines. Overview of the history and development of this medium and its uses in education.

_____Teaching machines and self-instructional materials. Education Digest, v. 25, no. 4. pp. 1-4. December 1959

_____ & Glaser, Robert, eds. Teaching machines and programmed learning. Dept. of AV Instruction, NEA. 1960

A source book containing abstracts of the literature in this field from 1920 to 1960 with the center of emphasis on developments in the 1950's. Appendix includes research abstracts. Basic in proving background to this movement.

Lumsdaine, A. A. & Klaus, D. J. What's in a name? AV Communication Review, v. 9, no. 4. pp. 208-11. July 1961

Discussion of the connotations of terms pertaining to teaching machines and programed learning and the significance of these connotations.

Lysaught, J. P. Programmed learning: evolving principles and industrial applications. Foundation for Research on Human Behavior, Ann Arbor, Mich. 1961

Reports of presentations by leaders in education, business, and industry of the status of learning theory, how it applies to teaching machines and programed learning, reports or experiments in industry and education. Samples of programs. bibliog.

Lysaught, J. P. & Williams, C. M. Community explores programed learning. New York State Education, v. 49, no. 5. pp. 24-27. February 1962

Report on the approach used by the Department of Education of the University of Rochester to introduce teaching machines and programed learning to the community and to the educators in the community.

McClellan, James. Automated education: a philosophical approach. Center for Programed Instruction. 1961

Educational philosophy re-examined in light of development of programed instruction.

McNeil, J. D. Teaching machines can help improve status of teachers. Chicago School Journal, v. 43, no. 4. pp. 176-80. January 1961

Presents the thesis that the particular values in the use of teaching machines lie in the opportunities they offer for research into basic questions regarding teaching techniques. As a research tool for identification of specific teacher actions which induce various kinds of learning, they can isolate factors of timing, phrasing, mode, and the non-cognitive areas or "feelings."

Maccia, E. S. Making clear our ideas about teaching machines. TIP, v. 1, no. 1. pp. 43-6. February 1962

Basic ideas necessary in thinking about teaching machines and four basic areas about which some thought is necessary: the nature of learning; what kind of learning is required; when learning constitutes knowing; and how this movement relates to current and emerging situations in education. Bibliography.

Mager, R. F. Preparing objectives for programmed instruction. Fearon. 1962

The significance of a clear definition of objectives in the preparation of programed materials. How to put these objectives into use within the program, and how to measure the effectiveness of the materials through measurement progress.

_____What are teaching machines doing to teaching? AV Communication Review, v. 9, no. 6. pp. 300-5. November 1961

Indicates need for understanding objectives and uses of teaching machines, how to organize subject matter for programing, what job satisfactions may be realized by using these techniques.

Marguiles, Stuart, & Eigen, L. D. Applied programed instruction. Wiley. 1962

Compilation of articles by various authorities in the field covering: what programed instruction is; applications of programed instruction in industrial and military training; differences in various kinds of systems; programing agencies; market analysis; samples of programs.

Markle, S. M. & others. Programmed primer on programming. Center for Programed Instruction. 1961

Brief presentation of basic facts of programed instruction, showing examples of "split-book" and fill-in materials.

Marty, Fernand. Programing a basic foreign language course; prospects for self-instruction. AV Publications, Roanoke, Va. 1962

Practical guide for developing a program, demonstrating the application of principles of the analytical method, sequence development, testing and evaluating programed materials.

(Hollis College--Project for Self-Instruction in French)

Matchett, M. S. Teaching machines or what? Mathematics Teacher, v. 55, no. 5. pp. 351-5. May 1962

Down-to-earth comparison of traditional methods of instruction with those of the teaching machine and programed materials. Explains values in different kinds of structuring, and emphasizes that content and the adaptation of content for individual students are the significant factor in all education.

Moser, Marilyn. How to balance chemical equations. School Science and Mathematics, v. 62, no. 5. pp. 307-11. May 1962

Experience of a college student participating in one community's seminar on science, and how this led her to develop a programed unit. Describes how she selected a unit, how she analyzed the content to determine the mode, and how the construction of the unit occurred.

Murdock, A. C. Let's try a "learning machine." Science Teacher, v. 28, no. 3. pp. 40-1. April 1961

Presents one type of learning machine in pictures; shows how it functions and its use. Delineates need for projects in research to test various phases of use.

New mathematics and programed learning: directory of programs. AV Instruction, v. 8, no. 3. pp. 158-60. March 1962

A list of programed materials available in the area of mathematics from various sources.

Newmann, F. M. Teaching machines, a primer. Educational Screen and AV Guide, v. 40, no. 1. pp. 25-7. January 1961

An overview of what teaching machines are, psychological learning theory which relates to this kind of program, advantages and limitations, and examples of sequences in programed materials.

Nordberg, R. B. What teaching machines can and cannot do. Catholic Education Review, v. 59, no. 6. pp. 361-7. September 1961

Analysis of 6-phase communication theory of the author, application of it to the teaching machine and programed materials concepts. Analyzes the potential in terms of this 6-phase theory.

Odell, William. Teaching machine evaluation. Teaching Materials Corp. 1962

Practical suggestions for a teacher's evaluation of teaching machines and programed learning materials. Gratis from the publisher.

Pisaro, S. E. & Emmerson, H. G. No more pencils, no more books. Phi Delta Kappan, v. 42, no. 8. pp. 363-4. May 1961

Description of a student's day in a "space-age" school leads to discussion of new technologies in education, how these can affect budget, organization of student schedules, and curriculum.

Pressey, S. L. Unresolved teaching-machine problems. Education Digest, v. 27, no. 9. pp. 1-3. May 1962

Describes typical organization of programed materials, pointing out its limitations. Suggests ways in which changes in use and in content may be more effective, and points the way to further development of learning theories.

_____Basic unresolved teaching machine problems. TIP, v. 1. no. 1. pp. 30-37. February 1962
Reprinted in Education Digest, v. 27, no. 9. pp. 1-3. May 1962

Areas of disagreement in the approach, development, and use of instructional programed materials and equipment, and suggestions for changes which the author believes must occur. Suggests these areas of conflict: use for drill and rate of use; coordination with other materials; physical presentation; cost; objectives, evaluations of use; learning psychology.

Program Descriptions. General Programmed Teaching Corp, Albuquerque, N. M. n.d.

A list of various programs available from the company, including those in preparation.

Programmed learning. Foundation for Research on Human Behavior, Ann Arbor, Mich. 1961

Compilation of speeches given by representatives from business, industry, and education on various aspects of programed materials and teaching machines: learning theory, program development, research and experimental projects, program designs.

Programed learning. Time, v. 67, no. 13. pp. 36-8. March 24, 1961

Report on Skinner's experiment with pigeons, his application of learning techniques to material organization and to development of machines for presentation, methods of control. Includes a sample of programed material and reports on experiments in progress. Illustrates with some sample teaching machines.

Programmed learning in education. General Programmed Teaching Corp. Albuquerque, N. M. n.d.

A twenty-paged pamphlet describing what programed learning consists of -- the materials, the machines, the handling of content. Includes brief history of influences leading to the development of concepts, and presents advantages of programed learning.

Programmed learning in Italy. School and Society, v. 90, no. 2206. pp. 124-5. March 10, 1962

Report on experimentation in a high school in Turin, Italy, using materials developed by Encyclopaedia Britannica Films, Inc. (TEMAC). Indicates experimentation will be conducted in France, Greece, Germany, and Federation of Rhodesia.

Programming of audio-lingual language skills for self-instructional presentation. College of Literature, Science, and the Arts, University of Michigan, Ann Arbor, Mich. 1961

Compilation of materials presented at the Conference of Language Programmers. Discusses various aspects of programing of language materials.

Programs, '62: a guide to programed instructional materials available to educators by September 1962. U.S. Government Printing Office. 1962

Bibliography of programed materials prepared at the request of the United States Office of Education. Annotated with sample frames or pages. Arranged alphabetically by subject. Includes 122 titles, with description of mode, number of frames or pages, indication of kind of machine for those requiring machines.

Rigney, J. W. & Fry, E. B. A survey and analyses of current teaching-machine programs and programing. Technical Report No. 31, Department of Psychology. University of Southern California, Los Angeles, California, 1961.

Contains information on the classification of program types, the construction of programs and tentative criteria for their evaluation.

In the chapter, "Practical Considerations for Programmers," problems such as length of a program, step density per concept and time required to write a program, are discussed. The appendix includes samples from eighty-one programs.

_____Current teaching-machine programs and programming techniques. AV Communication Review, v. 9, no. 3. Supplement #3. Entire issue. May-June 1961

Basic reference. Organized two parts, with the first section including background material on the development of this technique, description of its nature, techniques and practical applications, and programing factors. Second part summarizes some 80 samples of programing in various subject areas and points to the differences in style as the subject requires. Excellent bibliography.

Riley, S. B. Mr. Gradgrind and girl number twenty. National Educational Association Journal, v. 50, no. 8. pp. 22-5. November 1961

Discussion of the basic problem of whether or not the method of programed instruction can elicit from the student full understanding and appreciation of an area of learning. Distinguishes between science of learning and the act of teaching.

Robinson, Charles. Teaching machines. Journal of Business Education, v. 37, no. 4. & v. 37, no. 5. January & February 1962

A two-part presentation of a review of comments of Dr. Thomas Chatham, Jr. (Vice-President of Litton Systems, Inc.) describing learning results of this kind of technique, where it can be used, what can be used, and definitions of terms.

Part II describes the Audiovisumatic device, "Saki" (computer), and various kinds of equipment and their sources. Includes bibliography.

Rochester, N. Y., University of. Office of Educational Research. College of Education. Present and potential manufacturers of teaching machines. The University. 1961

A five-page mimeographed list giving names of manufacturers and developers of teaching machines, including name of device, type of equipment, and price.

Rothkopf, E. Z. Do-it-yourself kit for programmed instruction. Teachers College Record, v. 62, no. 3. pp. 195-201. December 1960

Description of programing techniques, difficulties of programing, theories of learning which apply, myths that are exploded, and directions for developing a program. Bibliography

Rothman, Philip. Pushbutton pedagogy. College and University, v. 36, no. 3. pp. 374-8. Spring 1961

Compares teaching machines to television and programed learning materials to workbooks, Suggests possibilities for use and limitations.

Rothwell, K. P. Programmed learning: a back door to empiricism in English studies. College English, v. 23, no. 4. pp. 245-50. January 1962

A critical projection of commentary on the application of programed learning in college English, both literature and grammar.

Sanborn, W. B. Some practical pointers on programming. Educational Screen and AV Guide, v. 41, no. 3. pp. 139-41. March 1962

Summary of observations by administrators and teachers using programed materials, giving both favorable and unfavorable reactions.

Sawyer, Rosemary, & White, E. H. Programmed learning. Instructor, v. 71, no. 10. pp. 46A-46D. June 1962

Gives five specifics common to all programed materials, discusses work of Pressey, Skinner, and Crowder in this field. Summarizes current research in process and the findings of reported research, and indicates other needed research areas.

_____Programmed learning. Instructor, v. 71, no. 10. pp. 46A-46I. June 1962

Presents two areas of controversy regarding programed learning: "Do these techniques have a place in education?" and "Can these methods teach?" Explains characteristics of these materials, relating them to Pressey, Skinner, and Crowder and their particular approaches, and reports on Fry's study.

Schoolman's guide to teaching machines. School Management, v. 5. no. 10. pp. 89-106. October 1961

Overview of the teaching machines-programed learning case at the time of publication. Three major divisions discussed in a practical, down-to-earth manner: Part I--what teaching machines are; Part II--how to make effective use of the teaching machine; Part III--list and description of available teaching machines and the materials available for use with them.

Schweickhard, D. M. Electronics in public schools. Minnesota Journal of Education, v. 41, no. 6. pp. 20-1. January 1961

Describes administrative and teacher uses of electronics, giving a brief background to the development of teaching machines. Characteristics of programed materials and advantages of their use.

Self instruction with teaching machines. American Library Association Bulletin, v. 55, no. 2. p. 121. February 1961

Brief statement of the differences in teaching machines, programed materials, and auto-instructional devices. Delineates characteristics of each.

Silberman, H. F. Digital computer in education. Phi Delta Kappan, v. 33, no. 8. pp. 345-7. May 1962

General survey of actual and potential uses of computers in education as calculators and teaching machines. How the computer can effect changes in school organizational patterns.

_____Teaching machines. Junior College Journal, v. 31, no. 6. pp. 318-20. February 1961

What auto-instructional programs are, review of the work of Skinner, Pressey, Crowder, and Pask in the area of programed learning. Describes several kinds of systems including computer equipment. Summarizes research and indicates further areas where research is needed.

Silverman, R. E. Auto-instructional devices. Journal of Higher Education, v. 31, no. 9. pp. 481-6. December 1960

Theoretical and practical considerations in use of programed materials, giving features and characteristics of various types of materials and processes of use. Role of teacher in curriculum planning and evaluation with programed materials. Implications for research and application. Bibliography.

Skinner, B. F. Something good happens to a child. Phi Delta Kappan, v. 42, no. 1. p. 27. October 1960

Summary of speech by Dr. Skinner at the August 1960 United States Office of Education Conference. Emphasizes forms of escape from learning as being controlled by the use of programed materials. Cites experiments under way at Pittsburgh (high school level mathematics), Roanoke (elementary algebra), Youngstown (elementary and junior high school arithmetic). Indicates variability of costs. Points to new materials in Spanish, French, Russian, logic, spelling, music, and physics as symptomatic of interest.

_____Teaching machine. Science, v. 128, no. 128. pp. 969-77. October 24, 1958

Summarization of needs in education and how programed instruction and teaching machines may meet these needs. Description of Skinner machine and programing techniques. Emphasizes significance of content and problems of proper content interpretation.

_____Teaching machines. Scientific American, v. 205, no. 5. pp. 91-102. November 1961

Rationale for the psychological basis of learning theory which applies to teaching machines and programed learning, with reports on experimentation at Harvard University, U. S. Naval Research Laboratory, Radcliffe College. Describes program development, machines used, teaching skills and role of teacher in programed learning.

Skinner demonstrates teaching machines. Phi Delta Kappan, v. 39, no. 1. p. 18. October 1957

Report on a demonstration presented to the American Psychological Association by Dr. Skinner. Describes equipment, materials, functions.

Smith, D. E. P. Teaching machine? Michigan Education Journal, v. 37, no. 14. p. 461. March 1960

Brief summary of what a teaching machine is, how it came to be developed, experiments in process, values claimed.

Smith, L. W. Open letter on teaching machines and programmed instruction. Arithmetic Teacher, v. 9, no. 1. pp. 29-31. January 1962

Brief summary of movement, the possible applications of this medium, the need for examination, research, testing, and evaluation. Bibliography.

_____Open letter on teaching machines and programmed instruction. Mathematics Teacher, v. 54, no. 7. pp. 570-2. November 1961

Summarizes development and describes various kinds of devices and machines used in programed learning. Cites issues which influence programer: cueing, error rate, vocabulary control, fading, and validation. Suggests implication of its effect on education.

Smith, M. D. Some considerations in teaching mathematics by programmed instruction. Mathematics Teacher, v. 55, no. 5. pp. 343-50. May 1962

Example of what a program is, how to develop various modes of programs, examples of various kinds of student behavior in response patterns, use of graphics.

Smith, W. I. & Moore, J. W., eds. Programmed learning: theory and research, Van Nostrand. 1962

Series of articles by authorities on the history of programed materials movement, techniques of programing, methods of evaulation of results. Gives a basic orientation to the area.

Snider, R. C. Teaching machines. Nations Schools, v. 67, no. 2. pp. 70-3. February 1961. Condensed in Education Digest, v. 26, no. 9. pp. 13-5. May 1961

Indicates current stresses on education, and relates the solution of these stresses to contributions possible through using programed materials and teaching machines.

Stolurow, L. M. Problems in evaluating automated instruction. Teachers College Record, v. 63, no. 1. pp. 67-70. October 1961

Indicates factors which create problems in evaluating automated instruction: acceleration of this type of program in education, need for determining whether or not to standardize equipment, varying psychological theories of the individual. How to approach the use of automated materials in light of these problems.

_____Teaching by machine. U. S. Dept. of Health, Education, and Welfare. 1961

Basic reference giving an overview of the entire field. One of the Cooperative Research Monographs (no. 6) being developed from federal grants. Does not discuss each section (such as programing techniques or teaching machines available) in depth, but provides good basic background.

_____Teaching machines and special education. Educational and Psychological Measurement, v. 20, no. 3. pp. 429-48. Autumn 1960; Condensed in Education Digest, v. 26, no. 4. pp. 14-7. December 1960

Presents information on ground-swell of activity developing in psychology, engineering, and education. Summarizes preliminary findings generated to stimulate further inquiry in area of special education. Includes historical development, nature of teaching machines and programed instruction, implications for research and reports on research, and questions still to be answered. Excellent bibliography.

_____Teaching machines: fad or fixture? Education Digest, v. 27, no. 4. pp. 6-9. December 1961

Implications of teaching machines in education -- structuring programs, re-examining the teacher's function, the student's orientation to his responsibilities, the changing emphasis on how learning occurs.

Summer meeting stresses technology theme. Audio-Visual Instruction, v. 6, no. 7. pp. 352-3. September 1961

Report of one-day meeting of the Department of Audiovisual Instruction (NEA), at which Dr. Edgar Dale discussed programed learning in terms of the two diverse goals -- education and training. Stressed the potential problems which the nature of teaching machines and programed materials may bring to those aspects of education involved with creative reaction and interaction.

Sweet, W. E. Programmed learning. Language Learning, v. 11, no. 3 & 4. pp. v-ix. 1961

Brief summary of programed materials and teaching machines which are presented in simple form with practical suggestions for selecting programs.

Symposium on the state of research in instructional television and tutorial machines. Institute for Communication Research, Stanford University, Stanford, Calif. 1960

A series of papers presented at a conference centered about how research may contribute to the understanding and use of newer instructional media. Particularly pertinent are the reports of Spaulding, Hilgard, Riley, and Lumsdaine which relate directly to learning theory and its application in materials and equipment for self-instruction.

Teacher in the automatic box. Overview, v. 2, no. 6. pp. 46-9. June 1961

Indicates that there has been varied degrees of acceptance of the application of behavioral science to science of learning. Discusses what is known, what is said, and what is lacking in application of teaching machines and programed learning in education.

Teaching machine guidelines: a joint statement. Audiovisual Instruction, v. 6, no. 7. pp. 358-9. September 1961

Eight guidelines developed by a joint committee of members from the Department of Audio Visual Instruction (N.E.A.), the American Educational Research Association, and the American Psychological Association, presenting information which can be used to develop utilization and evaluation standards and which presents a picture of what teaching machines can and cannot do.

Teaching machines. School Management, v. 5, no. 10. pp. 90-113. October 1961

A three-part article exploring many different opinions and facts both for and against teaching machines and programed learning. Part 1 is concerned with "What they are;" Part 2 covers "How to use them;" and Part 3 tells "Where to get them." Includes basic information on programing techniques, their function and educational theory. Part 3 describes each listed machine, identifying it as to type, cost, programs, and services available.

Teaching machines: a bibliography from the Education Library. Education Library, College of Education, University of Florida, Gainesville, Fla. 1961

A list of books, pamphlets, and articles on teaching machines. No annotations

Teaching machines and programed learning. Teaching Materials Corp. 1961

Unannotated bibliography of books, periodicals, brochures, articles, and bibliographies. Available from the corporation.

Test versus machines--with a re-interpretation of programed instruction. Audiovisual Instruction, v. 7, no. 6. pp. 373-375. June 1962

Report of presentations by speakers and discussions presented at the national convention of the Department of Audio Visual Instruction (NEA): programed instruction as method rather than medium; so-called "technical revolution" a revolution in behavioral science; programed materials with and without machines; verbal and non-verbal programing, and so forth.

The truth about those teaching machines. Changing Times, v. 16, no. 2. pp. 15-8. February 1962

Brief summary of Pressey's and Skinner's work in the area, relation of learning principles to programed materials as a medium, how various machines function. Reviews six experiments completed or in progress in education and business.

TIP, v. 1, no. 1. February 1962

Entire issue devoted to teaching machines. Articles reviewed here separately. Includes: Cook, Briggs, Guba, Homme, Lipson, Maccia, and Pressey.

Tomorrow's teaching. Frontiers of Science Foundation of Oklahoma, Inc., Oklahoma City, Okla. 1962

Proceedings of a symposium held by the foundation includes several papers on teaching machines and programed learning: Gerbner's "Technology, communications, and education;" Galanter's "Programed learning and teaching machines;" Komolski's "Theory of programed learning in action;" Finn's "Technology - potential for educational revolution;" Lawson's "Suggestion for programing teaching machines;" and Everett's "Programed learning in public schools."

Tonne, H. A. Ubiquitous teaching machine: observation, opinion and obiter dicta. Journal of Business Education, v. 36, no. 5. pp. 192-3. February 1961

Discusses problems and significance of fragmented programing, its relation to other educational problems such as cost factors, creativity, and so forth. Presents opinion that worth of programed instruction lies in its contribution to increased efficiency.

Tunnell, J. W. Teaching machines: program conveyor. Texas Outlook, v. 46, no. 5. pp. 42-3. May 1962

Crowder's and Skinner's methods are described and shown in examples of materials. Describes the theory of learning from programed methods and the characteristics of teaching machines.

Use of teaching machines will grow, but they won't replace textbooks: school adminstrators opinion poll findings. Nations Schools, v. 68, no. 6. p. 60. December 1961

Report of responses from a sampling of school administrators regarding programed learning and teaching machines, their potential use, their significance.

Using teaching machines to promote student self-instruction in secondary schools: symposium. Journal of Secondary Education, v. 37, no. 2. pp. 106-28. February 1962

Presents the five-fold psychological basis for teaching machine program, discusses sequence of student activity, suggests exploratory purposes of symposium. For individual articles see: Bali, Cassel, Chagy, and Bush.

Weir, E. C. What happened to the teaching machine? Educational Leadership, v. 18, no. 8. p. 517. May 1961

Satire presenting education in 2070 A.D. as it results from the influence of the teaching machine movement.

Wilson, J. S. R. & Robeck, M. C. Teaching machines and spelling. AV Communication Review, v. 9, no. 6. pp. 298-300. November 1961

Discusses the Crowder and Skinner pedagogical systems, and suggests a method of application programed to area of spelling. Relates this study to those of Penfield and Roberts on brain mechanisms of speech and to Holmes' and Hyman's study on spelling.

Winebrenner, D. K. Automation and education. School Arts, v. 57, no. 3. p. 48. November 1957

Questions the values of the teaching machine because this technique does not develop creativity in the child, because it is pre-package, because it restricts.

_____Launderettes and learn-o-mats. School Arts, v. 60, no. 9. p. 52. May 1961

A criticism of the teaching machine's programed materials movement from the standpoint of the need for developing creativity in the individual.

Winn, Sue. New technology: will it work? Grade Teacher, v. 79, no. 10. p. 12. June 1962

Brief statement of characteristics of programed instruction, how it can be used, how it helps educators do a better job.

_____Programmed instruction: panacea or plague? What teaching machines can do for us. Chicago School Journal, v. 43, no. 3. pp. 131-3. December 1961

Discusses programed instruction as application of learning theory, describing two main types (linear and branching). Enlarges on the specific and significant limitations of the use of teaching machines. Emphasizes need for educators to know what this method of instruction involves and how it can be used.

Wittich, W. A. Teaching machines: practical and probable. Nations Schools, v. 66, no. 2. pp. 54-5. April 1960

Reports on contributions of research by Pressey and Skinner, summarization by Lumsdaine of the unique characteristics of teaching machines. Discusses nature of programing: development of content in learning sequences, application of this kind of sequential development in the areas of spelling and arithmetic. Suggests relation of kind of use and the kind of learning involved.

Young, J. A. Programmed instruction in chemistry. Journal of Chemical Education, v. 38, no. 9. pp. 463-5. September 1961

Describes construction of paper and card devices and their use in an instructional program. Suggests use of these as pre-class preparation.

Zaun, C. G. & Schroeder, M. T. The drivotrainer: a teaching machine. Journal of Secondary Education, v. 37, no. 2. pp. 112-6. February 1962

How the drivotrainer is like a teaching machine, how it can be used, the evaluation of its use in the driver training program in the Los Angeles City Schools.

Zschokke, T. O. Mr. Brain helps in classroom. California Teachers Association Journal, v. 56, no. 6. p. 13. September 1960

Describes a "drill device" which has been used in the Riverside, California area for some years. How it helped relieve teachers of drill responsibility and how students reacted to it.

REPORTS ON RESEARCH STUDIES

Albright, Daniel. Approach to programming. Clearing House, v. 36, no. 4. pp. 206-8. December 1961

Describes an experiment carried on at Niles Township High School (Skobie, Illinois) using punch-board type of teaching machine constructed by custodian of the school. Reports on student reactions and the values of the experiment to the teacher.

Alter, Millicent, & others. Effect of confirmations plus trinket reinforcers on young children. Center for Programmed Instruction. 1961

Report of experiment in reinforcement by small trinket with pre-school children in learning number concepts.

Automated instruction for procedural skills required by professional personnel. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962 (OE 34002-7)

Abstract of experiment in process at the University of California to determine most effective ways of using new media to teach audio-visual operational skills.

Automated programs for teaching arithmetic concepts to mentally retarded children. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962 (OE 34002-7)

Abstract of study under way at the Partlow State School, Tuscaloosa, Alabama, involving the use of three different modes and two different types of programs with 30 students.

Basic properties of an automated teaching system. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of a study under way at the University of California presenting the purpose, method, and statistical information to be gained.

Belcastro, F. P. Programmed learning: relative effectiveness of four techniques of programming the addition and subtraction axioms of algebra. Doctoral Dissertation, University of Pittsburg. 1961

Description of an experiment to determine the relative effectiveness of four techniques of programing the addition and subtraction axioms of algebra. One variable involved presenting the mathematical rule before and after examples were presented. Another variable involved using a sufficient or minimum number of words in the programs.

Bell, T. H. Teaching machines and programmed learning in Weber County. Journal of Secondary Education, v. 37, no. 2. pp. 108-11. February 1962

Describes the trial use of various programed materials and teaching machines in Weber County School District, Utah. Shows briefly the application of each program in the school district, the teachers response, conclusions for each experiment. Practical and informative.

Black, H. B. Improving the programming of complex pictorial materials: discrimination learning as affected by prior exposure to and relevance of components of the figural discriminanda. Indiana University. June 1962

This study investigated the effect of prior experience in discriminating pictorial materials.

Blyth, J. W. Teaching machines and human beings. Educational Record, v. 4, no. 2. pp. 116-25. April 1960

Report on experimentation at Hamilton College, discussing advantages and disadvantages, implications for education. Cautions against assumption that the mechanization of the media of communication is related to the mechanization of the human mind.

Cassel, R. N. & Ullom, W. L. Preliminary evaluation of an automatic tutoring machine. Journal of Secondary Education, v, 37, no. 2. pp. 117-24. February 1962

Use of the Auto Tutor in teaching computer arithmetic to an average group of ninth and twelfth grade students in the Lompoc Unified Schools, Lompoc, California. Describes experimental procedure and the findings of the study.

Comparative studies of principles for programing mathematics in automated instruction. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of study at University of Illinois exploring many programing techniques for different purposes in high school mathematics.

Construction and evaluation of a self-instructional program in Russian. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of study being conducted at Indiana University involving both college and high school students.

Cook, F. S. Some advantages and limitations of self-instructional devices. Balance Sheet, v. 42, no. 4. pp. 154-6. December 1960

Summary of study involving the responses of 150 individuals in business, industry, the professions, and education to discover attitudes and evaluations of the real and potential values of self-instructional devices. Describes various kinds of teaching machines. Gives ten conclusions involving their use.

Coulson, J. E. & Silberman, H. F. Automated teaching and individual differences. AV Communications Review, v. 9, no. 1. pp. 5-15. January-February 1961

Reports on several significant studies in the area including the Automated Teaching Project, comparing the fixed-sequence and branching techniques, the use of computer-based machines, study of variables. Bibliography.

_____Effects of three variables in a teaching machine. Journal of Educational Psychology, v. 51, no. 3. pp. 135-43. June 1960

Report of study at Santa Monica City College, California, investigating variables of student responses mode, size of item step, and item sequence control. Describes three phases of the method of investigation, apparatus, procedures, and materials use. Findings indicate support of Skinner's emphasis on small steps, branching variable not significant in degree of learning, branching variable significant in time required for learning, mode (multiple-choice or fill-in) not significant.

Development and evaluation of programed language instruction for deaf children. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of experiment recently completed at the University of Pittsburgh with elementary school children.

Development and evaluation of self-instructional materials for underachieving and overachieving students. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of study under way at System Development Corporation at Santa Monica, California to investigate effects on informational and conceptual learning by self-instructional materials. High school students; mathematics.

Edgerton, A. K. Machine spelling and how it works. Grade Teacher, v. 79, no. 2. pp. 64-5+. October 1961

Report of an experiment in teaching spelling to elementary students in Weston, Massachusetts. Describes the experiment, gives suggestions for developing programs, and the advantages of this kind of teaching.

Effect of problem-setting questions on rate and amount of learning through teaching machines. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962 (OE 34002-7)

Abstract of study under way at Indiana University with eighth grade students to determine the influence of problem-solving questions on the acquisition and retention of information with instruction by machined programs.

Eigen, L. D. & Komoski, P. K. Automated teaching project. Collegiate School, 241 West 77th St., New York 24, N. Y. June 1960

Description of an experiment to investigate the relative effectiveness of mechanical teaching machines and programed textbooks as teaching devices, and to learn the effect of grade level on learning by means of these automated teaching methods.

_____Research summary no. 1. Center for Programed Instruction. 1961

Report of research using a comparison of teaching machines and programed textbooks.

Factors affecting the design of effective teaching machine programs. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962 (OE 34002-7)

Abstract of a study in process at Michigan State University. Includes purpose and methodology, and indicates statistical method to be used.

Falconer, G. A. Teaching machines for the deaf. Volta Review, v. 62, no. 2. pp. 59-62. February 1960

Report of a doctoral study developed for first year and kindergarten children with severe hearing impairment. Describes study, delineates significant learnings.

Ferster, C. B. The role of review material in continuous programming with teaching machines; January 1, 1960 to December 31, 1960. Office of Education. 1961

Report of a study at Indiana University Medical Center designed to determine the amount of repetition of review materials when using programed materials.

Fry, E. B. Research tools: instrumentation in educational research. Review of Educational Research, v. 30, no. 5. pp. 513-21. December 1960

Brief review of some of the research under way or completed (at the time of writing) in this area. Includes lists of doctoral dissertations related to this subject.

Goldberg, Stanley. A note concerning teaching scientific theory to first grade pupils by auto-instructional devices, by E. R. Keisler and J. D. McNeil. Harvard Educational Review, v. 31, no. 4. pp. 451-3. Fall 1961

Contests the interpretations and implications in use of teaching machines in article cited title. Cites failure of authors to clarify relation of scientific theory to use of correct language.

Gotkin, L. G. & Goldstein, L. S. Programed instruction for the younger learner: a comparison of two presentations made in two environments. Center for Programed Instruction. 1961

Comparison of programed texts and teaching machines used by elementary school children at home and in school in a research study.

Griffin, W. J. & Knudsen, K. D. Teaching machines and programmed textbooks in the high school English curriculum. High School Journal, v. 45, no. 5. pp. 218-24. February 1962.

Report on the Roanoke, Virginia, ninth grade study. Discusses various kinds of programing, what they can and cannot do, survey of what is being produced. Suggests caution and open minded approach.

Helmer, R. T. Some implications of programmed instruction for the teaching of mathematics. Mathematics Teacher, v. 54, no. 5. pp. 333-5. May 1961

Mathematics, an orderly sequence of content and a logical one, is particularly well-suited for programing. Demonstrates application in small step sequence and in larger patterns as well. Emphasizes that central values lie in the program which requires continuous student response, permits immediate reinforcement, and allows the student to set his own pace. Refers to the Pennsylvania State University experiments of presenting programed learning over closed circuit TV, which seeks to discover in what capacity it is most useful and in which areas it may have fullest application.

Herrick, M. G. The effect of problem-setting questions on rate and amount of learning in programming teaching machines. Indiana University. May 1962

Problem-setting questions have no significant effect on immediate or retained learning.

Horton, L. W. What the Roanoke teachers are saying. Audio-visual Instruction, v. 7, no. 3. pp. 154-5. March 1962

Report on the Roanoke, Virginia, experiment in teaching algebra, solid geometry, trigonometry, and calculus by using the TEMAC programed materials. Describes method of use, problems of adjustment to new techniques, results, and evaluation of program.

Hortense, Sister M. Programmed instruction in English. Catholic School Journal, v. 62, no. 5. pp. 42-4. May 1962

Report of the use of English 2600 (Harcourt) in a high school English class, describing the results and the problems, and making suggestions for the extension of the teacher's role with this medium. Bibliography.

Hough, J. B. Research vindication for teaching machines. Phi Delta Kappan, v. 43, no. 6. pp. 240-2. March 1962

Report of and implications of a study made at Temple University during 1960 to determine effectiveness and efficiency of teaching machines as compared to lecture-discussion method. Procedures of the experimental design, areas of significant differences in mastery of learning and in instructional time.

Houston, John. External control in programmed learning. Overview, v. 3, no. 6. pp. 32-3. June 1962

Among the findings following one semester's work with teaching machines, evidence from the Medford, Massachusetts, schools indicates that there is need for "external control" to be exercised by the teacher under varying circumstances. Some of these are described with suggestions concerning how this control may be effective.

Hughes, J. L. Effectiveness of programed instruction experimental findings for 7070 training. Center for Programed Instruction. 1961

Summarization of a research project at IBM in using programed instruction for training customer engineers. How the results relate to vocational training in science areas.

Hughes, J. L. & McNamara, W. J. Comparative study of programed and conventional instruction in industry. Journal of Applied Psychology, v. 45, no. 4. pp. 225-31. August 1961

Report of experiment in use of programed texts for the training of employees in the Data Processing System Servicing Course of I.B.M. Describes the experimental pattern, and lists results of six experimental groups as compared with control groups.

An investigation of programing principles as applied to the production and utilization of filmstrips and filmstrip-type materials in natural science. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of a study in process at Pennsylvania State University with fifth, eighth, and eleventh grade students.

Kalin, Robert. Use of programed instruction in teaching an advanced mathematical topic. Arithmetic Teacher, v. 9, no. 3. pp. 160-2. March 1962

Report of a study which sought to determine whether or not programed instruction could provide opportunity for the intellectually superior fifth and sixth grade students to learn mathematical concepts of equations and inequalities. Describes experimental design and results of this study.

Keislar, E. R. Development of understanding in arithmetic by a teaching machine. Journal of Educational Psychology, v. 50, no. 6. pp. 247-53. December 1959

Report of a study at University Elementary School (University of California, Los Angeles) in which programed materials and teaching machines were used with experimental and control groups of fifth and low grade sixth grade students for automated teaching of areas of rectangles using the Film Rater with multiple choice mode, kodachrome filmstrips. Describes equipment, total design of the experiment, results and conclusions gained from this work with 14 elementary students. Detailed and comprehensive. Bibliography.

_____ & McNeil, J. D. Teaching scientific theory to first grade pupils by auto-instructional devices. Harvard Educational Review, v. 3, no. 1. pp. 73-83. Winter 1961

Report of study of three-week instructional unit given to a sample of first grade students in science, using the Videosonic Tutor, color slides, and recorded commentary. Discusses study, shows examples, and provides a preliminary analysis of results and conclusions. Bibliography.

Komoski, P. K. What are the schools doing? National Education Association Journal, v. 50, no. 8. pp. 28-30. November 1961

Review of developments in the field. Indicates four interdependent facets of programed instruction: development, utilization, evaluation, and research. Cites need for local direction by educators to realize full potential. Examples: Newton, Massachusetts; Denver, Colorado; New York, New York; Pittsburgh; Rochester, New York; Montgomery County, Maryland; Manhasset, New York; University of Chicago, University of Southern Florida, Harvard, Mills College of Education, Oregon College of Education, University of Rochester, Rhode Island College, Columbia University.

Krumboltz, J. D. & Weisman, R. G. Effect of overt versus covert responding to programed instruction on immediate and delayed retention. Journal of Educational Psychology, v. 53, no. 2. pp. 89-92. April 1962

Report of a study at Michigan State University conducted to determine the degree of retention resulting from various methods of presenting material.

Leese, Joseph. Highlights on research on teaching and learning. High School Journal, v. 45, no. 7. pp. 314-22. April 1962

Summary of significant research in teaching and learning with particular attention to the relation of the findings pertaining to programed instruction and teaching machines. Extensive bibliography.

Lipson, Shirley. Personal reaction to two programmed textbooks. TIP, v. 1, no. 1. pp. 7-8. February 1962

Description of two parallel books and experience in working with both linear and scrambled program.

McNeil, J. D. & Keislar, E. R. Individual differences and effectiveness of auto-instruction at the primary grade level. California Journal of Educational Research, v. 12, no. 4. September 1961

Summary of a study with first and second grade students covering the science unit on molecular theory. Describes the experimental design, reports the findings, and lists significant conclusions which the study reveals.

Measures of programmed learning. Overview, v. 3, no. 2. p. 18. February 1962

Report of three evaluations of programed learning systems: one by I.B.M., one at UCLA's Department of Engineering, and the third at the UCLA freshman engineering laboratory. Brief summation of results of each.

Morse, A. D. Schools of tomorrow -- today! Doubleday. 1960

Descriptive presentation of nine major experiments in new approaches to educational problems, including several in the area of teaching machines and programed learning.

Motivational aspects of automated instruction. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of study in process at Bucknell University, Lewisburg, Pennsylvania, with eighth grade boys to determine effects of different error rates with two different types of motivation

Noall, M. S. Automatic teaching of reading skills in high school. Journal of Education, v. 143, no. 3. pp. 1-71. February 1961

Report on two studies in improvement of reading skills using various machines. Complete description of experimental pattern, methodology results, as well as statement covering materials used. Thorough.

Nunn, Gladys. English teacher looks at programmed learning. AV Instruction, v. 6, no. 9. pp. 441-2. November 1961

Report of a study at Central High School, Muskogee, Oklahoma, using the Harcourt, Brace English 2600. Describes the pattern, the procedures, the evaluations, and some recommendations based upon the results of the experiment.

O.K.'s children. Time, v. 66, no. 19. p. 103. November 7, 1960

Report of a 1960 experiment at Yale University in teaching pre-school children to read by using programed learning presented in teaching machine.

Pepinsky, H. B. & Borow, Henry. Automated learning and the counselor. Journal of Counselling Psychology, v. 8, no. 3. pp. 272-7. Fall 1961

Brief statements of reports of experiments at Collegiate School, New York; Hamilton College; Roanoke, Virginia public schools; Earham College and Harvard. Impact for the counselor and what some of the research indicates about the individual and his learnings.

Popham, W. J. & Sun, C. S. How many teaching machines? California Teachers Association Journal, v. 58, no. 3. pp. 38-42. March 1962

Report on investigation designed to produce evidence on the number of teaching machines necessary in an algebra classroom. Reports of student responses to the use of these materials as well as the mechanical and operational problems with machines.

Programing a course in thinking and problem solving. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of study under way at University of Nevada.

Reed, J. E. Aid for the teacher of English. English Journal, v. 50, no. 2. pp. 93-7. February 1961

Report on the development of an experiment in the Denver, Colorado, public schools in 1960.

Relationship between a learner's activity level and his learning effectiveness. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of study of University of Nebraska with college students, using various response modes which require various degrees of active response.

Roe, Arnold. Automated teaching methods using linear programs. Journal of Applied Psychology, v. 46, no. 3. pp. 189-201. June 1962

Description of an experiment to determine the effect on learning of using multiple-choice teaching machines, free-response teaching machines in individual booths, free-response teaching machines in a classroom, programed textbooks requiring overt responses and providing correct answers, programed textbooks requiring no overt responses, "programed" lectures, and standard lectures.

Rushton, E. W. Roanoke experiment. Nations Schools, v. 67, no. 2. pp. 76-9. February 1961

Report on Roanoke Public Schools, Roanoke, Virginia, experiment in testing the effectiveness of programed materials in first year of algebra. Describes experimental method, sequence, and results. Lists the problems encountered and their significance in developing other programs.

Schutz, R. E. & others. Teaching capitalization with a programed text. AV Communication Review, v. 10, no. 6. pp. 359-63. November-December 1962

Report of an experiment using programed materials to teach capitalization to fourth and fifth grade pupils at the Laboratory School of the Arizona State University. Describes the structure of the experiment, the method, the results, and the implications.

Shay, C. B. Relationship of intelligence to step size on a teaching machine program. Journal of Educational Psychology, v. 52, no. 2. pp. 98-103.

Describes experiment to determine amount of material which can be programed into individual step sequence for various IQ levels for achievement. Design, method, implications, and so forth included. Bibliography.

Shorthand by machine. Stenographic Machines, Inc., Skokie, Ill. 1962

Report of an experiment in high school stenographic course using machine shorthand training.

Silberman, H. F. & others. Fixed sequence versus branching autoinstructional methods. Journal of Educational Psychology, v. 52, no. 3. pp. 166-72. June 1961

Study carried on in five high schools in Los Angeles County, with 17 subjects in each of three groups. Describes purposes, methodology, research pattern, findings, and implications. Bibliography.

Silverman, R. E. Response mode, pacing, and motivational effects in teaching machines. U. S. Naval Training Device Center, Port Washington, N. Y. 1961

Report of a study inquiring into the relative results in learnings with variable modes of response, pacing, and motivational effects. Description of structure of study, results, and implications.

Smith, E. A. & Quackenbush, Jack. Devereux teaching aids employed in presenting elementary mathematics in a special education setting. Psychological Reports, v. 7, pp. 333-6. Southern Universities Press, October 1960

Description of an experiment to study the value of multiple-choice teaching machines to provide supplemental instruction in mathematics to a group of slow learners, mean IQ, 77, mean chronological age, 17.7 years.

Stolurow, L. M. Automation in special education. Exceptional Children, v. 27, no. 2. pp. 78-83. October 1960

General discussion of use of machines in areas of special education, examples of applications and of programing sequences. Bibliography.

Study of cueing on request or on a delayed response in automated instruction. Title VII -- New Educational Media News and Reports. U. S. Department of Health, Education, and Welfare; Office of Education. July 1962. (OE 34002-7)

Abstract of a study recently completed at the University of California, with college students in elementary psychology.

Wechkin, Stanley. Word learning in an automated teaching situation as a function of display condition. Journal of Educational Psychology, v. 53, no. 4. pp. 165-9. August 1962

Description of an experiment to determine the more efficient mode of presenting materials for word learning in a multiple-choice automated teaching situation with auditory and visual response alternatives compared.

TEACHING MACHINES

Audio-Visual Equipment Directory, 8th ed., edited by J. W. Hulfish. National Audio-Visual Association, Inc., Fairfax, Va. 1962

A basic and comprehensive listing of many different kinds of equipment in the AV field. Pages 281-292 include listings of teaching machines and manufacturers of teaching machines. Descriptions of equipment, model identifications, description of operations and materials.

A-Alpha Pattern & Mfg. Co., 2523 E. 4th St., Los Angeles 33, Calif.

Equipment: ALPHA - written response with mask, either sheets or roll Punching system.

Aeronutronic Division, Ford Motor Co., Ford Rd., Newport Beach, Calif.

Equipment: TACHDEN - mechanical response; computer type

American Systems, Inc., 1625 E. 126th St., Hawthorne, Calif.

Equipment: 1. INSTRUCTRON
2. INSTRUCTRON
16 mm. film, tape cartridge

American Teaching Systems, Inc., 12902 South Broadway, Los Angeles 61, Calif.

Equipment: MODEL 834 - mechanical response; 35 mm. filmstrips; tapes.

Astra Corp., 31 Church St., New London, Conn.

Equipment: AUTOSCORE, MODEL A, MARK II - mechanical response; light indicates correct answer.

AVTA Corp., 3450 Wilshire Blvd., Los Angeles 5, Calif.

Equipment: 1. AVTA 110 - written response, tape cartridge, answer tape
2. AVTA 440 - as above, plus sound unit

Billerett Co., 1544 Embassy St., Anaheim, Calif.

Equipment: TM-3 DISCOVERER - written response, punch correction

Comparator, P. O. Box 452, Petaluma, Calif.

Equipment: ARITHMETIC TRAINER - mechanical response; correct answer indicated by audial signal.

Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass.

Equipment: FRONT PROJECTION MODEL - written response to 35 mm. filmstrip or card programs; answer on tape roll.

Consolidated Lithographing Corp., Carle Place Post Office, Long Island, N.Y.

Equipment: 1. AUTOSCORE - written response with water-sensitive chemical color coding, by areas.
2. EDUMATOR - written response, answer tapes.

Corrigan Communications, Inc., 1111 Ash St., Fullerton, Calif.

Equipment: TELETEST (Teacher Console, Student Unit) - mechanical response, cued by teacher or other signal.

Craig Research, Inc., 310 South La Cienega Blvd., Los Angeles 16, Calif.

Craig Reader
Pre-programmed reading
Slide films
Student controls speed.

Devereux Teaching Aids, Box 717, Devon, Pa.

Equipment: 1. Model #15 - written response; uses cards
2. Model #90 - mechanical response; electrical response to constructed lessons
3. Model #50 - mechanical response; push-button response to workbook type materials.

Dictaphone Corp., 730 Third Ave., New York 17, N.Y.

Equipment: Audio device
Dictating machine & headphones

Digital Equipment Corp., 146 Main St., Maynard, Mass.

Equipment: PDP-1 COMPUTER - mechanical response; computer type.

Dukane Corp., St. Charles, Ill.

Equipment: REDI-TUTOR - written response; answer tape. 35 mm. projected frames.

Dyna Slide Co., 600 South Michigan Ave., Chicago 5, Ill.

Equipment: VERTIMASK
SLIDE-A-MASK
Written response, masked answer.

Edex, 809 San Antonio Rd., Palo Alto, Calif.

Equipment: TEACHING SYSTEM (Student Unit, Display Unit) - mechanical response; variety of materials; intercommunication between teacher and student.

Ed-U-Cards Manufacturing Co., 13-05 44th Ave., Long Island City, N.Y.

Equipment: ED-U-DATA - written response, push-button answer.

Education Engineering Associates, 3810 Pacific Coast Highway, Torroance, Calif.

Equipment: SPEED - mechanical response; 35 mm. projected slides.

Encyclopaedia Brittanica Films, Inc., Wilmette, Ill.

Equipment: TEMAC - written response, sliding mask
Special holder adapted for Temac programs

E-Z Sort Systems, Ltd., 45 Second St., San Francisco 5, Calif.

Equipment: E-Z SORT INSTRUCTOCARD - mechanical response with rods placed through edge-punched cards.

Field Enterprises Educational Corp., Merchandise Mart Plaza, Chicago 54, Ill.

Equipment: CYCLO TEACHER - written response, disc manipulation.

Finn, J. D. & Perrin, D. G. Occasional Paper No. 3. Teaching machines and programmed learning, 1962: a survey of the industry. National Education Association. 1962

One of a series of reports prepared for the Technological Development Project of NEA, under contract with US Office of Education. Discussion concerning machines and programs, lists of both materials and machines now available, with directory sources. Basic

General Atronics Corp., One Bala Ave., Bala-Cynwyd, Pa.

Equipment: 1. ATRONIC PORTABLE TAG - written, with responses keyed to metal "answer" plate.
2. ATRONIC TUTOR 580 - mechanical response; key press, automatic page-turning with correct answer.

Graflex, Inc., 3750 Monroe Ave., Rochester 3, N.Y.

Equipment: MICRO-AID - written response (workbook or anwer sheet); lever reveals answer to 35 mm. projected filmstrip.

Hamilton Research Associates, Inc., 4 Genesee St., New Hartford, N.Y.

Equipment: VISITUTORA #200 -- FILMCARD MODEL - written response; answer sheet to 35 mm. mounts.

Holland, J. G. Evaluating Teaching Machines and Programs. Teachers College Record, v. 63. pp. 56-70. October 1961

Presents criteria for evaluating the content and form of programs and for deciding when revision is needed.

HRB-Singer, Inc., P.O. Box 60, Science Park, State College, Pa.

Equipment:
1. STAR 2760 - mechanical response: light signal for correct answer
2. STAR 2762 - mechanical response: stylus and light signal

Hughes Aircraft Co. (VIDEOSONIC SYSTEMS), P.O. Box 9094, Airport Station, Los Angeles 45, Calif.

Equipment: VIDEOSONIC (Research Model) - mechanical response: 35 mm. projected slides and tape.

Instructive Devices, 8545 Academy Station, Albany 8, N.Y.

Equipment: TUTORULE - written response; or punch out.

Instrument Research Co., 12031 Euclid Ave., Garden Grove, Calif.

Equipment: PUNCHBOARD - mechanical response, IBM card.

Jensen, G. L., 1267 Wensley Ave., El Centro, Calif.

Equipment: JENSEN'S TUTOR - written and marked response, answer by punch.

Koncept-O-Graph Corp., 179 Berkeley St., Rochester 7, N. Y.

Equipment: KOG-7 - written response, answers on tape cartridge.

Kunins Engineering Co., 1730 Popham Ave., New York 53, N. Y.

Equipment: QUIZZO - mechanical response. Responses cued from teacher console.

Lectron Corporation of America, 9929 West Silver Springs, Milwaukee, Wis.

Equipment:
1. LECTRON MARK I - mechanical response; projected slides and tapes
2. MARK V REAR PROJECTION UNIT - mechanical response; slides and tape; multi-student arrangement
3. AUDIOVISION MARK IV - mechanical response; slides and tape; 2-person unit

Management Research Associates, Room 1300, 185 North Wabash Ave. Chicago 1, Ill.

Equipment: SELF TRAINER - mechanical response, pull-tab reveals answer

Markle, S. M. & others. A programmed primer on programming. Center for Programmed Instruction, 1961

An introductory explanation of programing using a programed method.

Marquardt Corp., 2709 North Garey Ave., Pomona, Calif.

Equipment: MESSAGE COMPOSER - mechanical response; computer type

Multi-Matics Machines, Inc., 6782 La Jolla Blvd., La Jolla, Calif.

Equipment: TUTOR-MATIC - mechanical response

National Blank Book Co., 2829 Water St., Holyoke, Mass.

Equipment: LEARN EASE DL-22 - written response, masked answers

National Communications Laboratories, 507 Fifth Ave., New York 17, N. Y.

Equipment: MODEL #3 - written response

National Educational Systems, Inc., 9250 Wilshire Blvd., Beverly Hills, Calif.

Equipment: RESEARCH MODEL - written response

Programmed Teaching Aids, Inc., 3810 S. Four Mile Run Drive, Arlington 6, Va.

Equipment:
1. FERSTER TUTOR - written response, answers on lesson sheet or tape
2. FORINGER 2002 - written response; answer tape
3. OSLER-FORINGER DISCRIMINATION DEVICE #1231- mechanical response

Publishers Co., Inc.

Equipment: TEACHALL - mechanical response, push button

Recordak Corp., 415 Madison Ave., New York 17, N. Y.

Equipment: MENTOR BISITEXT - written response; answer device to 16 mm. microfilm projections.

Renner Inc., 1530 Lombard St., Philadelphia 46, Pa.

Equipment: TRAINER-TESTER - marking to respond

Rheem Califone Corp., 5922 Bowcroft St., Los Angeles 16, Calif.

Equipment:
1. Didak 501 - written response; answer tape
2. Didak 601 - mechanical response; correct response activates next frame.
3. KEY PUNCH TRAINER - mechanical response; computer type operations

Smith Harrison, Inc., Devereux Teaching Aids, Box 717, Devon, Pa.

Equipment:
1. DEVEREUX TEACHING AID #90 - mechanical response; correct answer indicated by audial or visual signal
2. DEVEREUX TEACHING AID #50 - mechanical response; correct answer indicated by audial or visual signal
3. DEVEREUX TEACHING AID #80 - mechanical response

Standard Projector and Equipment Co., Inc., 7433 N. Harlem Ave., Chicago 48, Ill.

Equipment: VISUAL EDUCATOR MODEL 555 - mechanical response; 35 mm. filmstrip; answer tape

Staples Hoppmann, Inc., 500 E. Monroe Ave., Alexandria, Va.

Equipment: TWO-VU - mechanical response; variety of type of materials, with teacher console.

Staten, J. B., Box 44, Bay City, Texas.

Equipment
Written response

Teaching Machines, Inc., 235 San Pedro, N.E., Albuquerque, N. M.
Sales through Grolier's division, Teaching Materials Corp., 575 Lexington Ave., New York 22, N. Y.

Equipment:
1. MIN/MAX MODEL II - written response
2. MIN/MAX HOME MODEL (MM17) - written response
3. WYCKOFF FILM TUTOR (WK-2) - mechanical response; program on 35 mm. filmstrip
4. MULTIPLE CHOICE - mechanical response; program on 8 mm. filmstrip

Teleprompter Corp., 311 W. 43rd St., New York 36, N. Y.

Equipment: MULTIPLE PROJECTION UNIT - mechanical response; variety of materials with use of multiple screens possible.

Thompson Ramo-Woolridge, 8344 Fallbrook Ave., Canoga Park, Calif.

Equipment: MENTOR - mechanical response; 16 mm. film, tape, computer type

Training Systems, Inc., 12248 Santa Monica Blvd., Los Angeles 25, Calif.

Equipment: Research Model - mechanical response; 35 mm. filmstrip projection

Universal Electronics Laboratories Corp., 510 Hudson St., Hackensack, N. J.

Equipment: UNIVOX - written answer

U. S. Industries, Robodyne Division, 12345 New Columbia Pike, Silver Springs, Md.

Equipment: MEMOTUTOR - mechanical response (memory drill)

USI Western Design & Electronics, Santa Barbara Airport, Goleta, Calif.

Equipment: 1. AUTUTOR MARK I - mechanical response; 35 mm. film (as filmstrip or films)
2. AUTOTUTOR MARK II - mechanical response; 35 mm. film (as filmstrip or films)

U.S. Photo Supply Co., Inc., 6478 Sligo Mill Road, Washington 12, D. C.

Equipment: OMNIBOX TEACHALL - mechanical response; correct answer by audial and light signal

Van Valkenburgh, Nooger, and Neville, Inc., 15 Maiden Lane, New York 38, N. Y.

Equipment: TRAINER-TESTER - mechanical response

Video Engineering Co., Inc., Riggs Road at First Place, N.E., Washington 11, D. C.

Equipment: T. V. EDUCATOR

Viewlex, Inc., Holbrook, Long Island, N. Y.

Equipment: TEACHING MACHINE (Research Model) - written answer; answer tape for 35 mm. filmstrip projection

Williams Research Corp., P.O. Box 95, Walled Lake, Mich.

Equipment: SCIENCE DESK - mechanical response; 16 mm. sound film

LEARNING THEORY - PSYCHOLOGY OF LEARNING

Carpenter, C. R. Boundaries of learning theories and mediators of learning. AV Communication Review, v. 10, no. 6. pp. 295-306. November-December 1962

Development of learning theories, their components, interaction of the variables involved in learning, and the significance of media in the learning experience.

Deterline, W. A. An introduction to programed instruction. Prentice-Hall. 1962

Practical and theoretical aspects of learning and teaching are discussed in relation to programed instruction techniques. Summarizes history of auto-instruction, relating it to programed instruction. Special attention is given to the work of Pressey, Skinner, and Crowder, along with demonstrations of the types of materials developed by each and the machines which present the programed materials. Discusses the role of the teacher. An over-all presentation giving basic information.

Filby, Yasuko. Teaching machines: a review of theory and research. Munksgaard, Copenhagen, Denmark. 1961

Over-all background to the teaching machine and programed learning area, giving historical development, learning theory applicable to automated teaching; advantages of automated teaching; different approaches and attitudes toward it; survey of experimental literature and research studies.

Galanter, Eugene. The mechanization of learning. National Education Association Journal, v. 50, no. 8. pp. 16-9. November 1961

Explanation of psychological principles of learning pertaining to programed instruction. Reviews Skinner's work at Harvard on developing behavioral patterns through appropriate stimulus and reinforcement. Indicates how teaching machines and programed learning apply these psychological principles and gives the advantages of this technique.

_____Two models of a student. Teachers College Record, v. 62, no. 3. pp. 187-94. December 1960

Various aspects of learning theory are presented: characteristics of the learner, associational theory and organizational principles, self-propulsion, creativity, and other phases as they relate to programed learning and teaching machines.

Glaser, Robert & Schaefer, H. M. Programmed teaching. Journal of Teacher Education, v. 12, no. 1. pp. 107-13. March 1961

Discusses the psychological principles behind programing: correct learning, reinforcement, elimination of punishment, unlearning of incorrect responses by withholding approval. Indicates adaptability for individuals, and suggests relation of teacher to this method.

Green, E. J. Learning process and programmed instruction. Holt. 1962

Puts into practical form the relationship between the findings of behavioral psychology and their use in education through programed instruction. Explains structures of programing, values, applications, and implications in education.

Hilgard, E. R. Theories of learning. Appleton-Century-Crofts. 1956

Basic text on learning theory which provides fundamental research on which programed instruction is based. Additional section on current developments in the psychology of learning.

_____What support from the psychology of learning? National Education Association Journal, v. 50, no. 8. pp. 20-1. November 1961

Relates the principles of individual differences, active participation, knowledge of results, organized structure of knowledge, spaced review, and reduction of anxiety to the use of programed materials in learning. Explains the teacher's role in dealing with technology, pointing out specific contributions of the teacher which may become more effective.

Holland, J. G. & Skinner, B. F. Analysis of behavior. McGraw. 1961

Textbook in psychology which is, in itself, a programed text. Designed to be used with machine, but adapted to traditional book format with added feature of "feedback." Illustrates many characteristics of programing materials.

Keller, F. S. Learning reinforcement theory. Random. 1954

Simple, brief explanation of what the reinforcement theory is, giving examples of how it applies to human learning.

_____ & Schoenfeld, W. N. Principles of psychology. Appleton. 1950

Basic textbook of behavioral psychology based upon experimental findings and presenting experimental methods.

Kneller, G. F. Automation and learning theory. School Review, v. 70, no. 2. pp. 220-32. Summer 1962

Critical exploration of the Skinner theory of teaching machines, the relation of learning to the developments in automation, and of the goals of learning which can be achieved with automationed media.

Lawson, Reed. Learning and behavior. Macmillan. 1960

Basic textbook on learning theory as related to behavior: habits, interrelation of habits, factors which influence learning, how learning occurs.

McDonald, F. J. Motivation and the communication process. AV Communication Review, v. 9, no. 5. pp. 57-67. September-October 1961

The difference in the natures of motivation and communication processes, how communication sources may provide motivation or may require specific techniques to result in motivation. Suggests multiplicity of motivation process with many variables as integral parts of it.

McNeil, J. D. Great didactic and automated teaching. Education, v. 81, no. 9. pp. 566-9. May 1961

Scientific method in education, propounded by Comenius, as it now relates to scientific realism in education is reflected in new educational trends. Learning theories are applied in the new technologies and there is a systematic application of scientific principles to content of learning and to its organization. Major weakness in educational planning today is lack of long-range approach to provide continuity in experimentation and practice.

Mowrer, O. H. Learning theory and behavior. Wiley. 1960

Synthesis of logical and factual background to stimulus-response learning theory, what affects each, react, role of habit, role of negative influences, positive results, and reinforcement.

_____Learning theory and personality dynamics. Ronald Press 1960 biblio.

Basic text on learning theory presenting the background of current problems and issues in field experimental work behind them. Relates the findings to behavioral motivation.

Pressey, S. L. Basic unresolved teaching-machine problems. TIP, v. 1, no. 1. pp. 30-7. February 1962

Some of the deviations in modern teaching-machine theory from older versions and the implications which relate to this shift. Bibliography.

Silverman, R. E. Automated teaching: a review of theory and research. U. S. Naval Training Devices Center, Port Washington, N. Y. 1960

Psychological background to programing movement, how programing functions in learning, examples of programing, various machines, and studies comparing this technique with non-automated techniques. Practical suggestions for developing programed materials.

Silvern, L. C. Teaching machine technology: the state of the art. Audio Visual Communication Review, v. 10, no. 3. pp. 204-17. May-June 1962

Contributions of Dr. Charles R. Allen, Frank Cushman, and others to the development of educational programs and training programs using new technologies. Nature of instruction and how content may be organized for instruction by machine. Professional organizations influential in this movement, and guidelines for those interested in it.

Skinner, B. F. The science of learning. Harvard Educational Review, v. 24, no. 2. pp. 86-97. Spring 1954

Discussion of the nature of developmental psychology. Report on the famous "pigeon experiment," and applies findings to human learnings and to handling of subject content.

_____Why we need teaching machines. Harvard Educational Review, v. 31, no. 4. pp. 377-98. Fall 1961

The rationale behind programed learning presented by one of the psychologists whose experimentation and resultant theories are, in a large degree, responsible for this entire movement.

Spence, K. W. Relation of learning theory to the technology of education. Harvard Educational Review, v. 29, no. 2. pp. 84-95. Spring 1959 biblio.

Discusses work of experimental psychologist in pure research and the relation of these studies to applied psychology and learning theory. Describes the pitfalls of each and the divergent findings. Suggests applications in education today.

Stolurow, L. M. Teaching by machine. Cooperative Resource Monograph No. 6. Department of Health, Education and Welfare; Office of Education, Washington, D. C. 1961. 173 pp.

Excellent theoretical approach to principles and practices of programed instruction. Instruction analyzed as a communication and control process. Relationship between conditions of learning and the process of programing is explored. Entire chapters devoted to teaching machines, techniques of programing and current research findings. Of particular interest is the discussion of the psychological implications of programed instruction.

Teaching machines and programmed learning: symposium. National Education Association Journal, v. 50, no. 8. pp. 15-30. November 1961

Includes seven articles concerning various phases of programed learning and teaching machines: "Mechanization of Learning" by Galanter; Joint Committee Statement (American Educational Research Assoc., DAVI of NEA, and American Psychological Association); "What Support from the Psychology of Learning" by Ernest R. Hilgard. Bibliography. Each part is listed and annotated separately in this bibliography.

SOURCES OF PROGRAMED MATERIALS

Note: If the developer of the materials differs from the source, entry has been made under the SOURCE. This has been done so that the user of the bibliography may easily procure checklists or materials themselves.

Prices have not been given since that would have called for single entries for every program.

Accelerated Instruction Methods Corp., 175 North Michigan Ave., Chicago 1, Ill.

General Science

Addison-Wesley Publishing Co., Reading Mass.

(sequential programing)

Statistics

Allen, Layman, E., Yale Law School, New Haven, Conn.

Logic

American Institute for Research, 410 Amberson Ave. Pittsburgh 32, Pa.

(sequential programing)

Arithmetic: English money

Appleton-Century-Crofts
see:
Basic Systems, Inc.

Astra Corporation, 31 Church St., New London, Conn.

Arithmetic
Biology
Spelling

AVTA Corp., 3450 Wilshire Blvd., Los Angeles 5, Calif.

(sequential programing)

Algebra: 9-12
Arithmetic: 5, 6
Statistics: 9

Basic Systems, Inc., 42 E. 52nd St., New York, N. Y.
(pub. by Appleton-Century-Crofts)
Meredith Pub. Co., 34 W. 33 St., New York 1, N. Y.

(sequential programing)

Modern mathematics
Geometry
Trigonometry
Vector

Billerett Co., 1544 Embassy St., Anaheim, Calif.

Modern Mathematics: Set Theory
Symbols and Number Series
Arithmetic
Geometry
Statistics

Center for Programmed Instruction, Inc., 365 West End. Ave., New York 24, N. Y.

Modern mathematics
Programing

Coronet Instructional Films. Coronet Building, Chicago 1, Ill.

Chemistry
Geography
Guidance
Language Arts
Mathematics
Guidance

Denver Public Schools, 414 Fourteenth St., Denver, Colo.

(sequential programing)

Spanish

Devereux Teaching Aids, Box 717, Devon, Pa.

(sequential programing)

Arithmetic
Remedial reading

Doubleday and Co., Inc., 501 Franklin Ave., Garden City, N. Y.
Called "Tutortexts" - scrambled book type

Algebra
Modern mathematics
Arithmetic
Computer mathematics
Calculus
Math for technicians
Use of slide rule
Statistics
Introduction to electronics
Bridge
Trigonometry
Parliamentary procedure
Arithmetic of computers
Everyday contracts

E-Z Sort Systems, Ltd., 45 Second St., San Francisco 5, Calif.
(Prog. developed by Educational Development Association)

(multiple choice)

Algebra
Arithmetic
English (Usage, Punctuation, Capital Letters, Spelling, Vocabulary Building)

Earlham College, Richmond, Ind.

(sequential programing)

Statistics

Educational Aids Publishing Corp., Carle Place, Long Island, N. Y.

Algebra
Arithmetic

Educational Development Associates, 2302 J St., Eureka, Calif.
(See also E-Z Systems, Ltd.)

Word Clues

Educational Engineering Associates, Inc., 3810 Pacific Coast Hwy., Torrance, Calif.

Algebra
Calculus
Geometry
General mathematics
Trigonometry
Shorthand
English (Basic English, Grammar, Punctuation & Capitalization, Spelling)
Insurance premium financing
Arithmetic
Biology
Electronics
Parliamentary procedures

Encyclopaedia Britannica Press, Inc., 425 N. Michigan Blvd., Chicago 11, Ill.

(referred to as TEMAC)

Algebra
Arithmetic
Modern mathematics
Calculus
Computer mathematics
French
Geometry (Plane & Solid)
Trigonometry
German
Spanish

Field Enterprises Educational Corp., Merchandise Mart Plaza, Chicago 54, Ill.

Arithmetic

General Atronics Corp., One Bala Ave., Bala-Cynwyd, Pa.

Mathematics

General Education, Inc., 96 Mount Auburn St., Cambridge 38, Mass.

Arithmetic
Statistics

General Programed Teaching Corp., 1719 Girard N.E., Albuquerque, N. M.

(sequential programing)

Arithmetic
Statistics
Principles of debate
French
Music
Chemistry

HRB-Singer, Inc., P.O. Box 60, Science Park, State College, Pa.

Algebra
Geometry

Hamilton Research Associates, 4 Genesee St., New Hartford, N.Y.

(sequential programing)

Algebra
How to use a micrometer

Harcourt, Brace & World, Inc., 750 Third Ave., New York 17, N.Y.

Arithmetic
English
Modern mathematics
Programed instruction
Psychology

Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York 17, N. Y.

Modern mathematics
Chemistry
Trigonometry

Institute of International Research & Development, Inc., P.O. Box 4456, Lubbock, Tex.

(Referred to as INRAD)

Algebra
Spelling
Arithmetic
Charts & graphs
Social studies

International Teaching Systems, 457 Washington S.E.,
Albuquerque, N.M.

Use of slide rule

Jensen, G. L., 1267 Wensley Ave., El Centro, Calif.

Social studies

Learning, Inc., 1317 W. Eighth St., Tempe, Ariz.

Modern mathematics
Algebra
Calculus
Slide rule
Statistics

Macmillan Co., 60 Fifth Ave., New York 11, N.Y.

Modern mathematics
Arithmetic
Geometry
Algebra
Logical thinking and mathematics
Statistics

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N.Y.

(sequential programing)

Modern mathematics
Arithmetic
Mathematical logic
Statistics
Trigonometry
Business mathematics
Psychology

National Teaching Machines, Box 4016, El Paso, Tex.

Algebra

New York Institute of Technology, 135 W. 70th St., New York, N.Y.

Modern mathematics

Programed Teaching Aids, Inc., 3810 S. Four Mile Run Drive,
Arlington 6, Va.

Algebra
Elementary math
Trigonometry

RCA Educational Services, Camden 8, N.J.

Computer mathematics
Logic

Rheem Califone Corp., 5922 Howcroft St., Los Angeles 16, Calif.

Statistics

Roto-Vue (Model Pub. Co.), 211 North 7th St., 1212 Holland Bldg., St. Louis 1, Mo.

General science

Science Research Associates, 259 E. Erie St., Chicago 11, Ill.

Modern mathematics
How we measure things with a ruler
Words
General science

Sigma Press, 2140 K St. N.W., Washington 7, D. C.

Basic mathematics & science & engineering

TMI-Grolier, 575 Lexington Ave., New York 22, N.Y.

(sequential programing)

Stenospeed
Spanish
Statistics
Chemistry
Electricity
Physiology
Music
United Nations
Biology
German
Algebra
Arithmetic
Modern mathematics
English (punctuation, spelling, remedial reading)
Russian
Hebrew

Teaching Machines, Inc., 235 San Pedro, N.E., Albuquerque, N.M.

(sequential programing)

Algebra
Modern mathematics
Arithmetic
Computer mathematics
Calculus
Statistics

TOR Education, Inc., 55 Fifth Ave., New York 3, N.Y.

Metric system
Precision & significant figures
Slide rule

Universal Electronics Laboratories Corp., 510 Hudson St., Hackensack, N.J. (Prog. developed by Univox Institute)

(sequential programing)

Algebra
Arithmetic
English (grammar, spelling)
Spanish
General science
Social studies

Varian Associates, 611 Hansen Way, Palo Alto, Calif.

(sequential programing)

Applied science

Webster Publishing Co., St. Louis 26, Mo.

(sequential programing)

Modern mathematics
Arithmetic
Statistics

Western Design & Electronics, Santa Barbara Airport, Coleta, Calif.

Algebra
Computer mathmatics
Slide rule fundamental
Math essentials for science and electronics
Trigonometry

Wiley, John & Sons, Inc., 440 Fourth Ave., New York, N.Y.

Algebra
Statistics
Physics

Young, Jay A., King's College, Wilkes-Barre, Pa.

(sequential programing)

Chemistry

PERIODICALS SPECIFICALLY ON PROGRAMED INSTRUCTION AND TEACHING MACHINES

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Order from: P.O. Box 508
Saddle Brook, N. J.

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New York 24, N.Y.
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Center for Programed Instruction
365 West End Ave.
New York 24, N.Y.
Issued quarterly. $7.50 per year for individual; $9 per year for library.

AV MATERIALS WHICH PRESENT TEACHING MACHINES AND PROGRAMED LEARNING

TEACHING MACHINES. Part I & Part II. s. films. 30 min. ea., bw. ($15 per day rental).

University of Washington
AV Service
Seattle 5, Wash.

LEARNING AND BEHAVIOR. 16 mm. s. film. bw. 80 min. ($15 rental per day). Charles Collingwood interviews B. F. Skinner.

Carousel Films
1501 Broadway
New York, N.Y.

TEACHING MACHINES. 35 mm. 2 filmstrips. 62 frames, c. An example of a teaching machine program. $13.

Basic Skill Films
1355 Inverness Drive
Pasadena, Calif.

AND NO BELLS RING. 16 mm. motion picture. 51 min. bw. ($3 rental)

National Education Association
1201 Sixteenth St., NW
Washington, D.C.

REINFORCEMENT IN LEARNING AND EXTINCTION. 16 mm. s. film. 15 min., bw. ($1.75 rental for 3 days).

McGraw-Hill
330 W. 42nd St.
New York, N.Y.

TAPED INTERVIEW. Dr. Barlow, Dr. Crowder, et al.

Department of Audio Visual Instruction
National Education Association
1201 Sixteenth St., NW
Washington 6, D.C.

TEACHING MACHINES AND PROGRAMMED LEARNING. 16 mm. s. film. 35 min., bw. Commentary by Skinner, Lumsdaine, and Glaser.

Department of Audio Visual Instruction
National Education Association
1201 Sixteenth St., NW
Washington 6, D.C.

MR. KEISLER AND MR. PRESSEY. 16 mm. s. film. bw. Art Linkletter on teaching machines and programed learning.

Rheem Califone Corp.
1020 N. LaBrea Ave.
Los Angeles 38, Calif.

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